



FRIDAY, JULY 19, 1878.

Locomotive Cylinder Boring Machine.

For the engraving of this machine we are indebted to our contemporary, *Engineering*, which says that "this machine is one of a series of tools specially adapted for dealing with locomotive repairs, of which the firm are exhibitors. The arrangement of the machine we illustrate is so clearly shown by our engraving that a detailed description will be unnecessary, and we need only say that it is well designed for its purpose."

Train Accidents in June.

The following accidents are included in our record for the month of June:

REAR COLLISIONS.

On the evening of the 4th a freight train on the Central Railroad of New Jersey ran into the rear of a coal train in Elizabeth, N. J. Several cars were wrecked, and some oil-tank cars on the freight caught fire, four cars and the locomotive being entirely destroyed. The fire was only kept from spreading by great exertions on the part of the railroad men and the local fire department.

On the morning of the 10th, as a freight train on the New York, New Haven & Hartford road was thrown from the Woodmont, Conn., to avoid a preceding train, which had

killing one passenger, injuring six others badly and 13 less severely.

DERAILMENT, BROKEN AXLE.

On the afternoon of the 30th, the rear car of a passenger train on the New York, Lake Erie & Western road was thrown from the track near Southfield, N. Y., by the breaking of an axle. The axle broke at the journal, and is said to have been much heated.

DERAILMENTS, BROKEN TRUCK.

On the morning of the 6th, a passenger train on the Chicago, Burlington & Quincy road was thrown from the track near Camp Point, Ill., by the breaking of a truck under the tender.

On the 23d, the rear car of a gravel train on the New Jersey Midland road was thrown from the track near Newfoundland, N. J., by the breaking of a truck.

DERAILMENT, BROKEN SWITCH-ROD.

On the night of the 25th, three cars of a freight train on the Boston & New York Air Line were thrown from the track at Lyman Viaduct, Conn., by the breaking of a switch-rod.

DERAILMENTS, BROKEN BRIDGE.

On the afternoon of the 11th, a long trestle at Miller's Spring, Pa., on the Bellefonte & Snow-Shoe road, gave way under a passenger train, wrecking the train, killing one passenger, injuring four trainmen and two passengers. The trestle is said to have fallen for 550 feet; it was 65 feet high.

On the morning of the 13th, a bridge over the Etowah River, near Rockmart, Ga., on the Cherokee Railroad, gave way under a freight train, and the engine and six cars went down into the river and were wrecked, injuring one man. The bridge was a Howe truss, 300 ft. span, and is reported as "a very old one," and "was to have been replaced at an early day."

DERAILMENTS, WASH-OUT.

On the 7th a passenger train on the Western Union Division of the Chicago, Milwaukee & St. Paul road ran into a wash-

New York, New Haven & Hartford road was thrown from the track by a misplaced switch at Windsor Locks, Conn., the engine running some distance and upsetting into the canal, and several cars leaving the rails.

On the 24th a passenger train on the New York, Lake Erie & Western road was thrown from the track at Port Jervis, N. Y., by a misplaced switch. The engine was damaged and the train delayed an hour and a half.

DERAILMENTS, OPEN DRAW.

On the afternoon of the 2d the engine and three cars of a freight train on the Lake Shore & Michigan Southern road went through the open draw of a bridge at Toledo, O., and into the Maumee River. The train was long and on a down grade and could not be stopped in time.

On the 25th the engine of a freight train on the New York Central & Hudson River road ran through an open draw and into the canal at Cayuga, N. Y.

DERAILMENT, RAIL REMOVED.

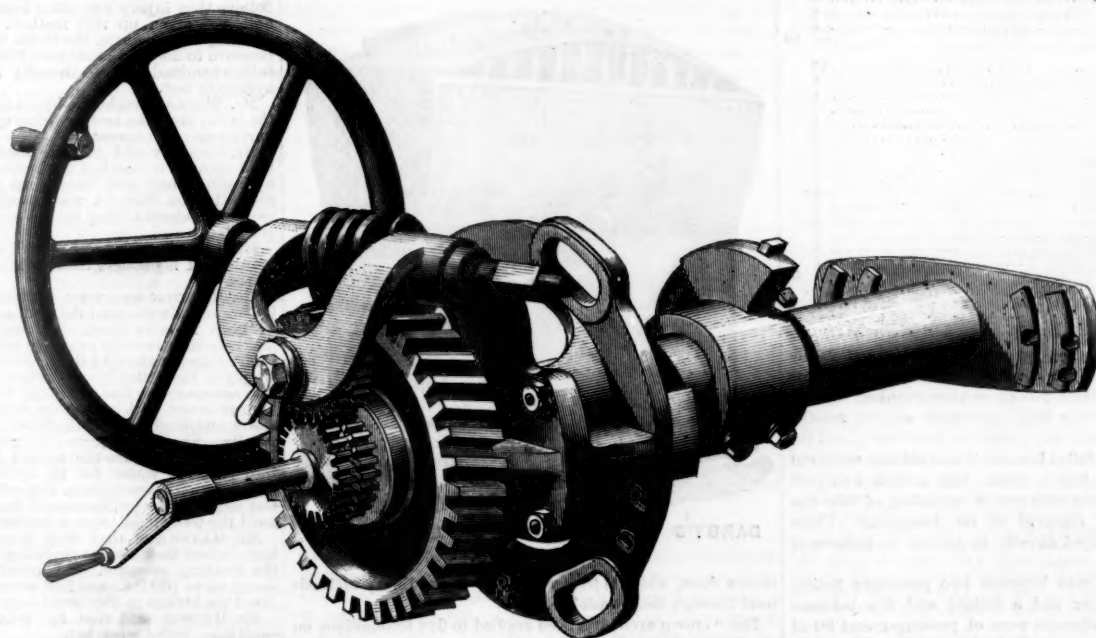
On the 23d the engine and several cars of a freight train on the Philadelphia & Reading road were thrown from the track near Auburn, Pa., where some trackmen had taken a rail out of the track to replace it, and had neglected to put out signals. The engine and several cars were damaged.

DERAILMENTS WITH MALICIOUS INTENT.

Very early on the morning of the 9th a freight train on the Georgia Railroad struck a misplaced switch in Atlanta, Ga., and the engine went off the track and upset, while five cars were piled up on top of the tender, making a bad wreck. The switch had been purposely misplaced.

On the morning of the 28th a passenger train on the Chicago & Northwestern road was thrown from the track near Appleton, Wis., by the spreading of the rails. The engine was wrecked, the engineman and fireman badly hurt. The fastenings of a rail had been removed, and tramps are believed to have done the work.

On the evening of the 29th an express train on the Phila-



PORTABLE BORING MACHINE FOR LOCOMOTIVE CYLINDERS, AT THE PARIS EXHIBITION.

By Messrs. Sharpe, Stewart & Co., Engineers, Manchester, England.

stopped to fix a car, the couplings broke and the engine and three cars started on and ran into the preceding train, wrecking three cars and injuring the conductor. The track was blocked several hours.

Early on the morning of the 25th an extra freight train on the Atlantic & Gulf road ran into the rear of a passenger train which had stopped to take on wood at Reppard's Mill, Ga. Several cars were damaged, a trainman and two passengers slightly hurt.

On the morning of the 25th a car broke loose from a freight train on the Central Branch, Union Pacific, in Atchison, Kan., and ran back down a grade into an engine standing on the track. The car was wrecked.

On the morning of the 26th a freight train on the Atchison, Topeka & Santa Fe road ran into the rear of a preceding freight near Offerle, Kan., doing a little damage. It is said that reckless running by the second freight caused the accident.

BUTTING COLLISION.

On the afternoon of the 1st, near Upton, Ky., on the Louisville & Nashville road, there was a butting collision between two passenger trains on a curve in a deep cut. Both engines, both postal cars and a baggage car were wrecked; two trainmen were killed, three trainmen, four postal clerks and two passengers hurt.

On the morning of the 9th there was a butting collision between a passenger train and a wild engine on the Grand Trunk road, near Brockville, Ont. Both engines and two cars were damaged and a fireman hurt.

On the morning of the 18th an express train on the Chicago, Rock Island & Pacific road ran into the head of a freight which was switching some cars at Edgerton, Mo. Both engines were badly damaged and one person hurt.

On the 23d a Walkill Valley gravel train ran over a misplaced switch and into the head of an Ulster & Delaware freight at the junction of the two roads in Rondout, N. Y. Both engines were damaged, a fireman fatally hurt and three other trainmen less severely injured.

CROSSING COLLISION.

On the morning of the 28th a Minneapolis & St. Louis freight train ran into a St. Paul & Pacific passenger at the crossing of the two roads at St. Anthony Junction, Minn., wrecking the Pacific smoking car. The crossing is in full sight on both roads for some distance, and though accounts are somewhat conflicting, the Minneapolis & St. Louis train appears to have run on to the crossing without making the required cautionary stop.

DERAILMENT, BROKEN RAIL-JOINT.

On the morning of the 7th a passenger train on the Houston & Texas Central road was thrown from the track near McKinney, Tex., by a broken rail joint. The ladies' car and sleeping car rolled down a high bank and were wrecked,

out near Cedar Rapids, Ia., and the engine and baggage car upset.

On the 26th a coal train on the New York & Oswego Midland road went into the gap where a culvert had been washed out during a violent storm, near East Guilford, N. Y. The engine went down and 36 coal cars were piled up on top of it in a bad wreck.

DERAILMENTS, ACCIDENTAL OBSTRUCTION.

On the morning of the 23d several cars of an empty coal train on the Philadelphia & Reading road were thrown from the track near Dornier's Mill, Pa., by a dump-door, which fell from the bottom of a car on the rails.

On the afternoon of the 26th nine cars of a coal train on the New York, Lake Erie & Western road were thrown from the track near Howell's, N. Y., by a draw-head which pulled out and fell on the rails. Both tracks were blocked some time.

On the 27th six cars of a freight train on the Pittsburgh, Cincinnati & St. Louis road were thrown from the track near Greenfield, Ind., by a brake-beam which dropped on the track. The road was blocked several hours.

DERAILMENTS, CATTLE.

On the evening of the 10th a coal train on the New York, Lake Erie & Western road ran over a cow near Goshen, N. Y., and the engine and 18 cars were thrown from the track and piled up in a bad wreck, blocking both tracks two hours. The engineman was killed and the fireman hurt.

On the morning of the 17th a freight train on the Old Colony road ran over an ox, near Newport, R. I., and several cars were thrown from the track and badly damaged.

On the afternoon of the 17th a freight train on the Missouri, Kansas & Texas road ran over a cow near Emporia, Kan., and five cars were thrown from the track and badly damaged. Two brakemen were hurt.

On the afternoon of the 18th a passenger train on the Knoxville & Charleston road ran over a cow near Maryville, Tenn., and the engine was upset and badly damaged.

On the night of the 23d a passenger train on the Northern Central road ran over a man near McIntyre, Pa., killing him and throwing the engine and baggage car from the track. The road was blocked several hours.

On the morning of the 25th a freight train on the Philadelphia & Reading road ran over a heifer near Myerstown, Pa., and nearly the whole train ran off the track, wrecking several cars.

DERAILMENTS, MISPLACED SWITCH.

On the afternoon of the 5th the engine of a train on the Gilbert Elevated road was thrown from the track by a misplaced switch at the Sixtieth street station in New York, doing a little damage and delaying trains.

Early on the morning of the 20th a freight train on the

delphia, Wilmington & Baltimore road struck a tie which had been put across the track near Claymont, Del., and the engine, baggage car, postal car, and two express cars went into the ditch and were badly broken. The engineman, fireman and two tramps who were stealing a ride between the cars, were killed. A former employé was arrested on suspicion of placing the tie; he afterward confessed that he had done it, and was held for trial.

On the night of the 29th an oil train on the New York Central & Hudson River road ran off the track near Albany, N. Y., at a place where a rail had been removed by some persons unknown. The engine was damaged and 19 cars piled up and wrecked; the oil caught fire and the wreck was burned up. A brakeman was caught under a car and burned to death, and the engineman and fireman were hurt.

UNEXPLAINED DERAILMENTS.

On the night of the 5th three cars of a freight train on the Illinois Central road ran off the track at Chebanse, Ill., and were badly damaged.

On the 6th 13 cars of a freight train on the Illinois Central road ran off the track near Manchester, Ill., blocking the road some hours.

On the afternoon of the 9th the engine and one car of a passenger train on the Georgia Railroad ran off the track in Atlanta, Ga., on a temporary track laid around a wreck.

On the morning of the 11th a passenger train on the Chartiers road ran off the track near Washington, Pa., injuring a brakeman.

Near midnight on the 11th a milk train on the Delaware, Lackawanna & Western road ran off the track in Newark, N. J., blocking the road a short time.

On the morning of the 12th a freight train on the New Jersey Midland road, ran off the track near Paterson, N. J.

Near midnight on the 12th seven cars of a freight train on the New York Central & Hudson River road ran off the track at Chittenango, N. Y., and were damaged, blocking all four tracks for a time.

On the night of the 13th a ballast train on the Quebec, Montreal, Ottawa & Occidental road ran off the track at Thurso, P. Q., wrecking the engine and ten cars, injuring the engineman and fireman.

On the morning of the 15th a car in a freight train on the New York, Lake Erie & Western road ran off the track near Ridgewood, N. J.

On the morning of the 17th a car in a freight train on the Chicago, Rock Island & Pacific ran off the track near De Kalb, Mo., dragging several others after it. The road was blocked several hours.

On the evening of the 18th, some cars of a coal train on the Pennsylvania road jumped the track at Rodebaugh's Tunnel, Pa., and some of the cars ran into a stock train, which was passing at the time, doing some damage.

On the afternoon of the 19th, some cars of a freight train

on the Pennsylvania Railroad ran off the track in the Bergen Cut, N. J., blocking one track for a time.

On the morning of the 20th, a freight train on the Newark Branch of the Central Railroad of New Jersey, ran off the track near Communipaw, N. J., doing some damage, and blocking the road several hours.

On the 26th, the rear car of an excursion train on the Logansport, Crawfordsville & Southwestern road ran off the track at Frankfort, Ind., and was damaged, injuring five passengers, and bruising several others slightly.

On the night of the 28th five cars of a freight train on the Missouri Pacific road were thrown from the track in Atchison, Kan.

BOILER EXPLOSION.

On the 30th a locomotive on the New York Central & Hudson River road exploded its boiler in Buffalo, N. Y., wrecking the engine.

OTHER ACCIDENTS.

On the evening of the 10th a flat car loaded with hay on the European & North American road caught fire when the train was near Enniskillen, N. B., and the load was burned up.

On the morning of the 27th a car in a freight train on the Erie road caught fire near Corning, N. Y., and was nearly destroyed.

This is a total of 56 accidents, whereby 12 persons were killed and 58 injured. Eight accidents caused the death of one or more persons; 10 caused injury but not death, while in 38, or 67.9 per cent. of the whole number, there was no injury serious enough to be recorded.

As compared with June, 1877, there was an increase of seven in the number of accidents, a decrease of four in the number killed, and a decrease of 34 in that injured.

These accidents may be classified according to their nature and causes as follows:

COLLISIONS:		
Rear collisions.....	5	
Butting collisions.....	4	
Crossing collision.....	1	
		10
DERAILMENTS:		
Unexplained.....	15	
Broken rail-joint.....	1	
Broken axle.....	1	
Broken truck.....	2	
Broken switch-rod.....	1	
Broken bridge.....	2	
Wash-out.....	2	
Accidental obstruction.....	3	
Cattle on track.....	6	
Misplaced switch.....	4	
Open draw.....	2	
Rail out for repairs.....	1	
Spreading of rails.....	1	
Rail removed purposely.....	1	
Malicious obstruction.....	1	
		43
Boiler explosion.....	1	
Car burned while running.....	2	
		3
Total.....		56

One collision was caused by a broken train, and one by reckless running; the crossing collision also, though accounts are conflicting, looks like a case of careless running. Of the broken bridges one was a long and high wooden trestle, nearly the whole of which is reported to have fallen, and the other appears to have failed because it was old and worn out and could not carry a heavy train. One switch was purposely misplaced and the only case of spreading of rails was caused by malicious removal of the fastenings. There were 11 accidents charged directly to defects or failures of road or equipment.

Of the collisions one was between two passenger trains, four between a passenger and a freight and five between freight trains; 13 derailments were of passenger and 30 of freight or service trains, and all of the other accidents were to freight trains. The ten collisions killed three and injured 18 persons, while the 43 derailments killed nine and injured 40.

The conspicuous feature of the month is the very small proportion of collisions, less than half the usual average. Four derailments with malicious intent are recorded, one by removing a rail; one by removing the fastenings so as to allow the rails to spread; one by misplacing a switch, and one by placing obstructions on the track. In one of these cases it is said that a person placed the obstruction, hoping to earn the company's gratitude by flagging and saving a train, but he was not quite quick enough. Three accidents are included which from their very nature imply carelessness in using or observing signals, two where trains ran into open draw-bridges, and one where trackmen removed a rail without first putting out warning signals. Misplaced switches are again on the increase.

For the year ending with June the record is as follows:

	No. of Accidents.	Killed.	Injured.
July.....	53	21	144
August.....	98	46	220
September.....	84	20	88
October.....	82	31	112
November.....	83	23	70
December.....	66	8	26
January.....	75	23	77
February.....	67	8	31
March.....	49	5	14
April.....	46	12	55
May.....	50	13	44
June.....	56	12	58
Total.....	809	222	939

The averages per day were, for the month, 1.87 accidents, 0.40 killed and 1.93 injured; for the year, 2.22 accidents, 0.61 killed and 2.57 injured. The average casualties per accident for the month were 0.214 killed and 1.036 injured; for the year they were 0.274 killed and 1.161 injured.

—Mr. Harvey G. Eastman, the first projector and most active advocate of the Poughkeepsie Bridge, died July 13, in Denver, Col., where he had gone for the benefit of his health. He was 46 years old. Mr. Eastman some 20 years ago established a commercial school in Poughkeepsie, which has grown into a large and prosperous establishment. He was a very active and public-spirited man and aided largely in improving and beautifying the city of Poughkeepsie, of which he was three times chosen Mayor. The bridge was his principal project and he spent much time and money in trying to secure its construction. He was also a director in several railroad companies.

Darby's Crown Arch.

The engraving is a perspective view, made from a photograph, of Darby's crown arch for locomotive fire-boxes. Its general construction is very apparent from the engraving. Instead of using the ordinary crown bars an arched plate, $\frac{1}{8}$ in. thick, with a rise in the centre of $6\frac{1}{2}$ in., is riveted at each end of the crown sheet and then stayed in the ordinary way between the ends, with $\frac{3}{8}$ bolts spaced $4\frac{1}{2}$ in. from centre to centre. Angle iron is riveted to the top, to which suitable sling stays are attached.

It is claimed for this method of strengthening the crown sheets of locomotives, that it weighs and costs much less than crown bars, that it prevents foaming or priming, and that the crown sheets can be kept much cleaner than is possible when ordinary crown bars are used. It is obvious that the steam, instead of rising direct from the crown sheet, and thus throwing the water to the throttle valve and into the steam pipe, is obstructed in its upward flow by the arch, and that the current must flow laterally and escape on each side of the arch and from there to the steam space above the water. It is also said that there are about 15 gallons more water over the crown sheet than in an ordinary engine, the crown bars occupying that much more space than the arch. The inventor writes that a gallon of black earth oil has been put into the boiler several times to test the arch as a preventive of foaming, and that the locomotive runner could see no difference in the working of the engine or carrying water from that cause.

In order to clean the crown sheet, three wash-plugs are placed in each side of the "wagon top" on a line with the



DARBY'S CROWN ARCH FOR LOCOMOTIVE FIRE-BOXES.

crown sheet, which is then washed by the ordinary methods used through these wash-holes.

The "crown arch" has been applied to five locomotives on the Kansas Pacific Railway, and one of them has been in use seven months, and has run over 24,000 miles, and it is said there has been no difficulty in keeping the crown sheet clean and that the engine burns less fuel than other engines in the same service.

The inventor is Mr. H. C. Darby whose address is Wyandotte, Kansas.

MASTER MECHANICS' ASSOCIATION.

Discussions at the Eleventh Annual Convention.

At the opening of the third day's proceedings the Committee on Long Runs for Locomotives was called upon, but no report was made.

LOCOMOTIVE TESTS.

The report of the Committee on Locomotive Tests (published in the *Railroad Gazette* for May 24) was then read. After some debate over the accompanying documents, they were referred to the Supervisory Committee, with power to print in the annual report such of them as might be deemed best.

A letter from Mr. W. W. Evans (published in the *Railroad Gazette* for May 24) was then read and debate invited. Mr. LAUDER referred to some statements as to the mileage of heavy engines on the Reading road, and thought that there must be some mistake.

Mr. HUDSON was informed that these engines were actually in service, hauling coal trains on laterals and had made the large mileage referred to.

Mr. LAUDER was willing to believe that the mileage had been made, but thought it a very extraordinary performance for engines of the class referred to, having five pairs of wheels coupled.

Mr. HUDSON said that the average life of engines referred to in Mr. Evans' letter should embrace only the time in actual service. If engines were laid up and properly cared for they would last an indefinite time.

The discussion on Mr. Evans' paper was then closed and the Committee report taken up.

Mr. WOODCOCK spoke of the greater attention now paid to economy in working, and urged that careful records be kept of all tests made, even in small matters.

Mr. RUSHTON thought that members should make more tests, and more careful records of performance.

Mr. JOHANN thought that the tendency of the times was toward heavier freight engines and longer trains. He had given much thought and time to the subject of the best freight engine, and was convinced that a better machine could be made than the present eight-wheel engine with 16 by 24 in. cylinders. What it should be is not yet quite apparent for general use, though special classes of engines had done very well on special work.

Mr. HUDSON said that he was now building an engine with the drivers all between the smoke-box and the fire-box, in

order to secure more adhesion. He also referred to the Forney engine.

Mr. JOHANN referred to the difficulty of making comparisons between different roads, owing to the great difference in the methods of keeping accounts. The charges were made in such different ways that no comparison in the cost of repairs, for instance, could be had. The ultimate test of the economy of a freight engine was the cost per ton hauled. The number of miles run to a ton of coal was no test, unless the tonnage hauled was also compared.

Mr. HUDSON thought that grades should also be taken into consideration.

Mr. HAYES thought that the location and condition of the road had much to do with it. On some roads the mogul engine was doing well, but on his prairie road he thought the eight-wheel engine did better work.

Mr. RUSHTON thought the mogul was best for a very heavy traffic, or where there were grades over 40 feet to the mile. Mr. WELLS said that the condition of the road and the nature of the traffic must determine the kind of engine to be used. There should be several different classes on roads with a heavy mixed traffic. It was impossible to find one class of freight engine which would be the best everywhere.

Mr. HUDSON agreed that it was impossible to decide on one class of engine as the best for all roads.

The discussion was then closed. Mr. F. B. Miles then read a paper on Capital and Labor (published in the *Railroad Gazette* for May 24), for which the thanks of the Association were voted him.

A paper from Mr. Gordon H. Nott was referred to the Supervisory Committee, with power to print.

TESTING BOILERS.

The following question was then submitted for discussion: What is the best plan for testing boilers, by hydraulic pressure, or otherwise?

Mr. WOODCOCK asked if it would not be better to make hydraulic tests with hot, instead of cold water.

Mr. JOHANN had been in the habit of using the hydraulic pump and testing up to 200 lbs., but he was now inclined to believe that injury was often done to the boiler by the test, and had given up this method. Now after carefully examining and repairing the boiler he fired it up and raised the pressure to 185 and sometimes 150 lbs., and then again carefully examined it. He thought this much better than the hydraulic test.

Mr. WELLS thought the hydraulic test less likely to injure the boiler than the test by firing up, because there were no variations of temperature.

Mr. SEDGLEY said that he filled his boilers with water, fired up until it reached the boiling point, then put on the hydraulic pump and forced the pressure up to 170 or 175 lbs. This he thought was a sufficient test. He was very particular about testing his boilers and examining at stated periods.

Mr. JOHANN said that he fired up more to test the workmanship of his boilers than their capacity to stand a heavy strain.

Mr. RUSHTON was very particular about examining his boilers and always used the hydraulic test. It was difficult to keep runners from carrying too high pressure. He had several boilers 22 years old and one 27 years old.

Mr. HUDSON thought the hydraulic test best to determine simply if the boiler would stand a certain pressure. It was also necessary to test for good workmanship. He used the hydraulic test with cold water, and then filled the boiler with water and fired up until there was a pressure of from 100 to 150 lbs. This was done to detect leaks, etc. They had never found the tests injure the boilers in any way. Sometimes they used hot water for the hydraulic test. This was the best way with new boilers, but with old boilers some other test might be better, because if they had been worked very hard the test might cause a rupture or explosion.

Mr. HAYES said that they were obliged by the Illinois laws to test their boilers periodically at 50 per cent. above the working pressure. He tested his with the hydraulic pump up to 160 lbs., and had never had any accident or injured the boilers to any great degree.

Mr. HUDSON said that his usual practice was to finish caulking a boiler when hot.

The discussion was then closed.

TENDER FRAMES.

The next question was: Which is the best material for tender-frames, wood or iron?

Mr. BOON said that wood was most used. The great trouble with iron frames was to keep the rivets tight. A wooden frame would last about seven years and make 250,000 miles.

Mr. LAUDER had used iron frames for five years and found they cost practically nothing for repairs. He had had no trouble keeping the rivets tight. He had had two of them in a collision with very little damage. He used a piece of oak plank an inch thick on the frame with the tank tightened down on the plank, so that there was no chance for it to jar or get loose. An iron frame would not cost at the outside above 50 per cent. more than a wooden one.

Mr. SEDGLEY had had about 100 iron frames in use for six years, and would make no more wooden ones. Some of their iron frames had been through collisions with very slight damage. He then exhibited drawings of his iron tender frames, and promised an accurate statement of the cost.

Mr. HUDSON thought iron frames economical, and able to stand very hard knocks.

Mr. BOON was doubtful whether the advantages of an iron frame would compensate for its greater first cost.

Mr. COOPER said that his iron frames cost him nothing for repairs.

The discussion was then closed.

ELECTION OF OFFICERS.

The next business in order being the election of officers, it was moved that it be postponed for a year, thereby continuing the present officers.

PRESIDENT CHAPMAN said that he was perfectly willing to retire. He had been Vice-President nine years and President two and would like to give some better man an opportunity.

The motion was carried unanimously.

MISCELLANEOUS BUSINESS.

The report of the Committee on Subjects for next convention was presented and adopted.

The report of the Committee on Place for Next Annual Meeting was presented.

Mr. JOHANN and Mr. SEDGLEY advocated Cincinnati, and that place was selected by a rising vote.

The report of the Committee on Resolutions was presented and the resolutions adopted, after adding the Richmond, Fredericksburg & Potomac Company to the resolution returning thanks for courtesies extended.

Mr. JOHANN made some remarks complimenting Secretary Setchel highly on the manner in which his duties had been performed, and moved that his compensation for the past year be fixed at \$700.

The motion was carried unanimously.

SECRETARY SETCHEL returned thanks in appropriate terms. He also referred to the contributions made by several

companies and by the locomotive builders to the printing fund.

On motion of Mr. MILES a vote of thanks was passed to the officers of the Association for their services, and to the committees for their valuable reports.

SECRETARY SETCHEL reported that assessments to the amount of \$480 had been paid by members present.

The PRESIDENT stated that the various committees would be appointed in due time and the members notified by the Secretary.

The Convention then adjourned to meet in Cincinnati on the second Tuesday in May, 1879.

English and American Railway Traffic Laws.

Under this head, Mr. John M. Douglas, a broker, of No. 1 Threadneedle street, London, one of the "Voting Trustees" of the New York, Lake Erie & Western Railroad Company, and experienced as a director in English and Canadian railroad companies, has communicated the following to the *Commercial and Financial Chronicle*. Mr. Douglas' opinion is more weighty in questions of finance than of traffic, but his letter will be found interesting and suggestive. We feel justified in protesting, however, against his statement that the special court of the Railway Commissioners "has proved in every way inferior to the ordinary courts to which an appeal is allowed." Aside from the favorable judgment of some of the very first authorities in Great Britain, such as *The Economist*, we have the evidence of the decisions of the Railway Commissioners themselves, several of which we have published. Many of these decide questions which no ordinary court could deal with, and experience in Great Britain has shown that such courts often refused to decide such questions, because they were aware that they could not distinguish the equities of matters which only special familiarity with transportation could make plain:

"A comparison in this journal (Dec. 15, 1877) of the laws regulating the internal organization of English and American railways, attracted considerable attention from the press and public. We now offer a similar comparison of the laws and customs regulating railway freight or goods traffic in the two countries, which are curiously different. And the differences are interesting and important, for they bear directly upon the great questions of transportation that so deeply affect the national life of America, and that have been so keenly debated both at the East and the West.

The English law is found in the Traffic act of 1873, which amended the previous legislation of a generation and carried it much further. The provisions for the public interest contained in that act present a striking contrast to the secrecy and irresponsible license allowed to American railway officials, superior and even subordinate, and which is so hurtful both to their constituents and the public.

The following are some leading points:

1. A list must be kept at each station, and must be open to every one, containing every rate charged from that station to any other place booked to, including any rates charged under special contract.

2. The facilities and rates must be equal for similar traffic under similar circumstances of distance, quantity, destination, etc., by whomsoever sent, even though by a competitor.

3. Every railway or canal can enforce through booking of goods, and satisfactory working of traffic as a through route, with through rates, over all railways or canals which form a continuous line of communication. The reasonableness of the routes and rates, if disputed, are judged of by the courts; but no company can be forced to accept a less mileage rate than it charges other people for like services between the two extremities of the through route in question; suppose from Omaha to New York, or from Cincinnati to Boston, or some much shorter distance.

By these rules every sender of goods is entitled to be placed on an equal footing with the most favored sender; and if one discover that another has had better terms, he can at once recover the difference from the offending railway. The result is that merchants compete with each other on equal terms, and no one is exposed to loss through the vagaries of freight agents. The rates charged, being all open to and easily compared by the public, are necessarily reasonable; for the present variety of routes available in England, as well as in America, would quickly correct any attempt to charge too much. The moderate dividends of the goods-carrying English railways show that they are not overpaid by the public. Their rates were arrived at by long and severe contest, such as still rage in America. But each company having learned the power of its neighbors, and of its ubiquitous competitors on the water ways, the rates are now rarely altered, though the companies compete incessantly and severely as regards attention, facilities and dispatch. All rates are fixed by the heads of the companies, and the agents have no power to tamper with them.

The English statutes about through rates and routes have been found essential there to preserve open communication for the inhabitants and business of the country, and at the same time they benefit the railways. In America the much vaster districts in which the rails are controlled by individual companies require far more these reasonable facilities. In both countries the natural tendency of a railway company is to make the district it serves a sort of preserve, in which no other company shall poach by taking traffic in, or out, or through. But the interest of the people is that there be the utmost freedom of communication in every direction. English law views the railway as a public highway, made by private persons, who are entitled to fair and full remuneration for the use of it, but who must permit that use freely and fully by all the people willing to pay for it, whether competitors or not.

Time was when the transportation of letters in America belonged not to the country as a whole, but to individual States. There were few letters which went into other States, and still fewer which went through one or more States into others beyond. But communication increased; the separate State government—inevitable for everything that is local—became utterly inadequate; and the United States Post Office was the necessary and excellent result, without injury to State rights, but with benefit to every State. The transportation of goods and passengers will follow the same law of necessary progress. Every day, in thousands of instances, goods and persons are received for carriage through several States to others beyond, and the conduct of that transportation is quite as much a matter of national interest as the carrying of letters.

The larger railways are mostly all really, if not nominally, in several States. Corporations used never to pass the State line, but now the old Buffalo & State Line Railway, with a number of others, are welded into the mighty corporation of the Lake Shore running through five States—a bit of it supposed to be controlled by each State, but the united whole being practically independent of them all. And there are many such cases. Yet there is no general American law regulating

either the internal affairs or the external relations of these vast undertakings, which, though in a republican country, have become despotic principalities, wielding revenues and power greater than the minor kingdoms possess, waging war like independent princes, and urgently needing regulation, both for the sake of the nation and for their own sake.

Laws can rarely be beneficially imported ready-made from one country to another, and experience has shown defects in the English Traffic act. Its requirements are in some respects too minute to answer—as in the books of rates, which are overloaded with countless trifles that smother and conceal the important items; and it established a special court, called "Railway Commissioners" (utterly unlike the officials so named in America.) This court has proved in every way inferior to the ordinary courts to which an appeal is allowed, and which would have done the work much better. When the Americans take up these subjects nationally, as ere long they must, having both the successes and failures of the Old World before them, they will be able to legislate better, on a wider field, and with far greater results than any other nation.

Contributions.

Pay Ticket for Facilitating the Payment of Employes.

DETROIT, July 10, 1878.

TO THE EDITOR OF THE RAILROAD GAZETTE:

In the "Scrap Heap" column of your issue of the 28th ult., in referring to the rapid payment of the Erie Railway employes, you say the money was counted *while the men signed their names to the pay-roll*.

That is a slow process. A quicker way is for each department to issue to each of its men two days before the paymaster goes out a pay ticket as follows, which the paymaster pays on presentation duly receipted, thus saving the time of the paymaster and the pay train on the road and the train-men on it.

..... Railroad.	
No. Department.
This certifies that has worked as a for days during the month of 187, at \$..... per day, and is entitled to the sum of dollars (\$.....).	
Received payment of the above amount,	
NOTE.—This ticket must be presented to the paymaster by the person to whom it belongs, and on no pretense whatever will it be allowed to be sold or given away for board bill.	

The number of the pay ticket corresponds with that of the entry on the pay roll. J. H. M.

The Blue Ridge Crossing of the Western North Carolina.

The extension of this road over the Blue Ridge requires some extremely heavy work. The average grade across the mountain is 104 feet to the mile, and there are several cuts over 100 feet deep and one fill 250 feet high. In some of the earth cuts the plan of sluicing, as used in hydraulic mining in California, has been used to good advantage. The progress and some of the difficulties of the work are thus described by the Hillsboro (N. C.) Recorder:

"The Blue Ridge, stretching across the State from northeast to southwest, on its eastern face presents a line of undulating peaks with outlying buttresses, projecting at right angles with the main chain, forming that congeries of mountains which gives the eastern side its varied, bold, but beautiful outline; these outlying buttresses between them enclosing the narrow valleys through which the numerous rivulets make their way to the plains. It might have suggested itself to engineers that the most feasible and economical way to cross the barrier was to pierce through its base to the other side. But it was found that the Blue Ridge did not fall away on the West as it did on the East, but that its summit was a plateau with an average level of 1,200 feet above the eastern base. It was therefore imperative to reach the other side by gradual approaches, and the valley of Mill Creek was chosen as the pathway. Not altogether, however, for its course is so tortuous and its valley so narrow that bolder conceptions, independent of any natural channel, were adopted. For a mile up Mill Creek the route is comparatively straight, the grade somewhat gentle, but beyond this point the difficulties rapidly thicken. Mountains look down on every side, and the many buttresses stretch out like arms of the octopus to grasp and stifle the puny efforts to penetrate their secret recesses. The road turns abruptly to the left, and here man begins to demonstrate that he will not be turned away from his resolve. Coming back to Mill Creek, it is crossed by a massive bridge of a single arch, 40 feet high, built of stone cut by the convicts, and constructed under the direction of the President, Major Wilson, who to save expenses is Engineer and Superintendent besides. A little further on, what means that double line of railroad, one seemingly built on top of the other? It is the road we are on, crossing a culvert the length of which is 320 feet, and crossing it, makes a long detour into some deep recess and peering into some shaded cove, and sweeping around the base of Round Knob, comes back again and crosses the culvert, but this time 120 feet above the lower track. Again the road makes another long sweep, reaches Mill Creek on an embankment, which, when complete, will be 240 feet high, crosses it, doubles back upon itself, and displays three nearly parallel lines of railroad, the distance between which is not more than 300 yards, but has taken two miles to accomplish. The last parallel has already reached a height of 300 feet above the first, showing that something has been gained toward the conflict for the summit. * * * * *

"There remains to be completed in crossing the Blue Ridge, about 10 lineal feet of blasting in one short tunnel, two other short ones being finished, and most of the trestles and cuts so far advanced as to admit of tracklaying within two months, so that by the middle of September the whole convict force of 475 can be transferred to the west side of the Swannanoa or main tunnel, which is 1,900 feet long, 300 of which remain to be completed. Much of the grading of the west side has been done; the balance of the work is comparatively light, and the President and directors hope that the next Legislature will find them in Asheville, from

whence the completion of the line down the French Broad to the Tennessee line is mere child's play, and will not consume a year."

THE SCRAP HEAP.

Railroad Manufactures.

The Ranlet Car Co., at Laconia, N. H., is building some passenger cars for the Boston & Lowell road, and the foundry is busy on car wheels.

The Louisville Car Wheel & Railway Supply Co. reports orders for the first half of 1878 as 50 per cent. larger than for the same time last year.

Mr. D. K. Ferguson, long known as connected with the management of the Vulcan Iron Works, yesterday stated that arrangements were being made for the starting of these works in the early fall. The interest on the bonded debt of \$1,000,000 had been scaled down from 10 per cent. to 7 per cent.; the floating debt of about \$500,000 had been entirely wiped out, the stockholders having had to go down into their pants pockets to pay 30 per cent. of it in ready cash, and everything promised an early starting up. The price of steel rails was advancing. Steel rails for winter delivery were selling at \$48 per ton, and the mills were so busy that it was impossible at any price to get rails for immediate delivery. The adoption of the new railroad tariff of the State had put down the rate of freight on Iron Mountain ore so that it would be delivered at the Docks Station for about \$5.40 per ton, the price ruling in 1873. The other ore used would come from Meramec or the Simmons banks, and taking all things together the prospects looked very bright for the stockholders of the Vulcan making some money. The proposed starting up will involve the three Vulcan furnaces and the entire steel rail rolling mill, and afford employment to about 1,200 men. Many of the men formerly engaged at the works have, of course, gone away, but Mr. D. E. Garrison has kept a careful list of all desirable hands and their locations, so that they can be recalled when business recommences. So that we shall once more have a smoking Carondelet, and a prosperous iron and steel interest in our midst. —*St. Louis Globe-Democrat*.

The Thielsen patent iron car-truck has recently been put under 250 box cars built by the St. Charles (Mo.) Car Co., for the Atchison, Topeka & Santa Fe; 100 built by the Wells & French Co., of Chicago, for the Kansas City, St. Joseph & Council Bluffs; 200 built by the Missouri Car & Foundry Co., for the Chicago & Alton, and 100 by the same for the Missouri River, Fort Scott & Gulf; 100 by the Michigan Car Co., for the Chicago & Michigan Lake Shore, and 50 built in the Richmond & Danville Railroad shops, making 800 new cars in all, supplied with this truck.

The Springfield, (Ill.) Iron Co. has just finished re-rolling a large lot of rails for the Wabash road.

The Schenectady (N. Y.) Locomotive Works have lately increased their force and are working on orders for the Central Pacific, the Chicago & Alton and the Chicago, Milwaukee & St. Paul.

There is a talk of removing the rolling mill lately started at Pueblo, Col., from that place to Denver, provided that Denver people will subscribe enough to pay the cost of moving it.

The Baugh Steam Forge Works, at Detroit, Mich., will soon begin the manufacture of steel by the Leighton process. The necessary buildings will soon be put up.

Bridge Notes.

The American Bridge Co., of Chicago, is running its shops full time. Among contracts on hand are bridges over the East and West Doxey rivers on the Chicago & Alton extension to Kansas City; seven iron spans and an iron trestle for the Chicago, Burlington & Quincy; three iron spans for the St. Paul & Sioux City, and a lot of iron-work for the North Chicago Street Railroad Company.

Clark, Reeves & Co., at Phoenixville, Pa., are at work on the iron for half a mile of the Metropolitan Elevated road in New York.

The King Bridge Co., at Cleveland, O., is busy on contract work, and has about 120 men employed in its shops.

In addition to the contracts previously mentioned, Morison, Field & Co., of Buffalo, N. Y., now have orders for the following railroad work: Ten pin-jointed structures of the following lengths: two deck spans, 156 ft.; two of 106 ft., and one of 80 ft.; one through span, 110 ft.; one of 100 ft.; two of 98 ft., and one of 85 ft. Also, one lattice girder, 80 ft. long; 16 plate girders, from 30 to 40 ft. long; 17 iron piers; 2 wrought-iron turn-tables, and 896 lineal feet of iron trestle for the Chicago, Burlington & Quincy Railroad, making a total of 2,793 lineal feet, all in iron.

Presents to Officers.

Vice-President Perkins, of the Chicago, Burlington & Quincy, recently issued the following order to the employes of that road:

"The practice of officers and foremen, and others in charge of men, receiving presents from their subordinates, is very objectionable and will not be permitted on this road.

"Too often men who cannot afford to contribute toward such presents feel constrained to do so rather than run the risk of incurring the displeasure of, or seeming unfriendly to, those having charge over them.

"A little reflection will convince any one of the evil of this practice. Courtesy toward the employed on the part of those in charge is as much due as cheerful obedience on the other side, and does not call for recognition through the means of presents.

"Neither should employes be solicited by those in charge to contribute toward any object, whether charitable, religious, or of any other character. Every employe is entitled to dispose of the compensation which he receives from the company as his inclination or necessities may dictate, and should not, in any manner, be influenced in so doing by his superior officers."

The Wharton Switch in Sweden.

This switch has been introduced into Sweden and placed on the Malmo-Ystad Railroad for a test, and it has passed through an Arctic winter without accident. A report expressive of satisfaction with its working has been drawn up by Count Fredrik Arvidsson Posse, who is engaged in the construction of a coast line, running from Engelhaven to Goteborg, a distance of about 143 English miles; and it is more than probable that the Wharton switch will be used on this new line.—*Engineering*.

Prices of Rails.

We learn of a sale of 1,800 tons of steel rails for prompt delivery at about \$44 per ton at mill. We also note a sale of 500 tons of English iron rails to go to California. These rails are to be carried at 8s. per ton. The difference in freight, as compared with shipments made from this port (New York) about counterbalances the import duty imposed, and gives the English product, at its present low price, an advantage. We quote iron rails at mill at \$31 to \$35, and steel rails \$42 to 44, according to quantity and time of delivery.

Old rails, without business, are quoted nominally at \$17 to \$18.—*Engineering and Mining Journal*.



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EDITORIAL ANNOUNCEMENTS.

Passes.—All persons connected with this paper are forbidden to ask for passes under any circumstances, and we will be thankful to have any act of the kind reported to this office.

Addresses.—Business letters should be addressed and drafts made payable to THE RAILROAD GAZETTE. Communications for the attention of the Editors should be addressed EDITOR RAILROAD GAZETTE.

Advertisements.—We wish it distinctly understood that we will entertain no proposition to publish anything in this journal for pay, EXCEPT IN THE ADVERTISING COLUMNS. We give in our editorial columns OUR OWN opinions, and those only, and in our news columns present only such matter as we consider interesting and important to our readers. Those who wish to recommend their inventions, machinery, supplies, financial schemes, etc., to our readers can do so fully in our advertising columns, but it is useless to ask us to recommend them editorially, either for money or in consideration of advertising patronage.

Contributions.—Subscribers and others will materially assist us in making our news accurate and complete if they will send us early information of events which take place under their observation, such as changes in railroad officers, organizations and changes of companies, the letting, progress and completion of contracts for new works or important improvements of old ones, experiments in the construction of roads and machinery and in their management, particulars as to the business of railroads, and suggestions as to its improvement. Discussions of subjects pertaining to ALL DEPARTMENTS of railroad business by men practically acquainted with them are especially desired. Officers will oblige us by forwarding early copies of notices of meetings, elections, appointments, and especially annual reports, some notice of all of which will be published.

NEW YORK TRADE AND TRANSPORTATION.

The letter to a New York merchant by Mr. Albert Fink which we published last week deserves more attention than it will receive, we fear, from the general public, including the merchants of New York, to whom it was addressed. The city newspapers have, so far as we have observed, published no more of it than was reported in a rejoinder by a committee of the New York Board of Trade and Transportation. And it is especially desirable that they should consider it, because it clears away some of the prevailing false ideas which somehow have become prevalent as to the basis of the difference of rates to and from the four chief Atlantic ports. These errors seem to have been the result of an insufficient examination of the facts by the merchants who do most of the writing on the subject, and to have been adopted without question by others.

Mr. Fink showed plainly that the differences in rates are not made in proportion to distances, and that in the case of many of the most important places the differences in favor of Philadelphia and Baltimore would be much greater than they now are if the rates were in proportion to distance. He also showed that the reports of expenses on the different roads do not indicate that the cost of carrying per mile is less to New York than to the other ports, but rather more; so that the position of the New York merchants would be made worse and not better by making the through rates in proportion to the cost of transportation by the chief New York roads. He might have shown also, historically, that the changes in the differences of rates to the different cities have been made in favor of New York and not against it; that not many years ago the agreed differences were very much greater than they now are, and that the reduction of these differences to the present very small amount has been obtained by the efforts—sometimes very costly efforts—of the New York railroads, without thanks or any recognition from the New York merchants. There was a time not many years ago when the agreed rates on the lowest classes of freights

from St. Louis, Louisville and Cincinnati were ten cents per 100 lbs. lower to Baltimore than to New York. In time this difference was reduced to five cents on low-class freight in both directions in favor of Baltimore and Philadelphia alike, being 10 cents for the higher classes. This difference was maintained for several years, during which there was a drawback of three cents per 100 lbs. on all grain exported from these two ports. The next change made the difference nearly in proportion to distance, from Chicago and St. Louis, and so varying with the rate, but being greater than it now is except when the rate is as low as 20 cents per 100 lbs. By the agreement now in force the difference in all classes of freight east-bound is two cents per 100 lbs. to Philadelphia, and three cents to Baltimore, and on west-bound freight six cents from Philadelphia and eight from Baltimore on the two upper classes, and two cents from Philadelphia and three from Baltimore on the lower classes.

Thus some years ago, a shipment of 100,000 bushels of wheat could have been made to Baltimore from Cincinnati or St. Louis for \$6,000 less than the cost of such shipment to New York. Now the difference is reduced to \$1,800. Then a shipment of 100,000 lbs. of sugar to Chicago or other Western markets cost \$50 less from Baltimore or Philadelphia than from New York; now it costs \$30 less from Baltimore and only \$20 less from Philadelphia.

We say that these change in favor of the New York merchants have been effected by the New York railroads, without recognition or thanks from the merchants. And we do not claim that thanks were due, though the work should have been recognized. These changes were made primarily, doubtless, because the New York railroads believed them to be for their own interest, and, indeed, they are evidence of the strongest kind that the New York merchants and the New York carriers are alike interested in cultivating and protecting the business of New York as far as possible. It seems to be forgotten that the diversion of traffic from New York to Philadelphia and Baltimore, and in a less degree, to Boston also, is a diversion of traffic, earnings and profits (when there are any profits) from the New York Central and the Erie railroads. There is no firm and no half-dozen firms in New York so much interested peculiarly in maintaining the business of New York as is the President of the New York Central & Hudson River Railroad Company and his associates in the ownership of the railroads which he manages. They cannot afford to have the business of New York destroyed, and they may safely be trusted to do their best to preserve it. Only in one event can they be imagined to become indifferent to it, and that is in case the transportation of it becomes wholly unprofitable. So long as there is a dollar to be made out of the through traffic, the New York railroad companies will try to secure the largest possible share of it for New York.

But the railroad companies learn practically, often by lessons which cost terribly, that there is a limit to their power to divert traffic and to prevent the diversion of traffic. Merchants have similar experiences, but they do not seem to imagine that they can have any application to railroads. If there are two competing merchants, two competing railroads or two competing cities, firmly established, we usually see that neither can get all the business from the other. The merchant may be bankrupted and cease to compete, but the city cannot easily be driven from the field, and the railroad cannot possibly be, unless its disadvantages are so great that its rival can carry at a profit at rates which net it a loss—and even then it may continue to compete, making up the losses on this unprofitable traffic by the profits on other traffic.

Nothing is more certain than that the railroads from Baltimore and Philadelphia will continue to carry through traffic forever, if they have to carry it without any profit, and that they will carry for a long time at a positive loss rather than surrender the traffic. If there is an undue increase at any place which can be prevented by a reduction in the rates elsewhere which will still leave a profit, we may be sure that the railroads interested will attempt such a reduction to protect themselves.

Now, it is always desirable that the merchants at the different cities should watch the course of business with them and their competitors, and be able to show the fluctuations in its amount, and indicate the cause. If New York is losing business to Philadelphia and Baltimore, or other places, it should be brought to the notice of the railroad companies and the community; and we should endeavor to ascertain the cause. It may be losing business, without fault of the railroads, and then they should not be called upon to prevent the diversion, unless, at least, it cannot be prevented otherwise. If it cannot, they, we may be sure, will be strongly tempted to interfere, and try to prevent the

loss of traffic by accepting four, three, two cents, or one cent of profit when the rate formerly gave them five cents. That is, railroad companies are like other associations that do business for gain; they like to make all the profit they can, but notwithstanding that, and because of that, they prefer to accept a small profit and get business rather than charge what would yield a large profit and lose the business.

Now we do not see that the evidence has been presented to show that New York has been losing merchandise business to its rivals, not to say evidence that it has been losing business because of the difference in rates in favor of Philadelphia and Baltimore. We have published statistics recently, showing that New York has this year gained greatly in grain business, compared with the other cities, and that it never received so small a proportion of the grain as when an attempt was made to make the rates to New York as low as to any other port. The recent rejoinder to Mr. Vanderbilt and Mr. Fink, however, states that the complaint is not of the east-bound but of the west-bound rates. Now it would be extremely interesting and valuable to have statistics of different branches of trade at the competing cities for a series of years, that we might know what the changes have been. The Board of Trade and Transportation, however, has not given us any such statistics. We know that the New York merchants complain of a loss of business, but that is almost a universal complaint, heard in Baltimore and Philadelphia, in London and Liverpool, as well as in New York. If people buy less than they used to, that may be a bad thing for those who supply them, both in New York and Philadelphia, but it does not follow that the New York railroad rates are at fault; if they buy less in New York and more in Philadelphia proportionally, then we have a case for examination, and a reason for seeking the cause.

Now the only facts which have any bearing on this matter which have come to our knowledge are the statistics of imports. These we take as they were given in the New York Times the other day, adding a column for the aggregate value of the imports of the four ports for each of the eight years:

Values of Imports at Four Leading Ports for Eight Years.

	Boston.	Philadel- phia.	Baltimore.	New York.	Total of four ports.
1870.....	47,524,845	14,300,797	19,512,408	203,300,096	375,528,116
1871.....	53,652,225	17,728,006	24,672,871	357,909,770	453,962,872
1872.....	70,398,185	20,383,853	28,836,305	418,515,829	538,134,172
1873.....	68,083,307	25,385,150	29,287,603	429,321,427	542,077,087
1874.....	55,212,405	20,447,037	29,302,138	395,133,622	500,095,202
1875.....	51,082,226	24,236,387	27,788,992	368,637,580	472,645,185
1876.....	37,413,623	22,471,516	22,340,629	311,712,910	393,938,678
1877.....	42,275,153	19,096,815	22,327,928	330,031,959	414,301,855
8 years....	423,542,941	170,827,561	204,067,934	2,902,253,103	3,700,788,539

This justifies the New York merchant's complaint of a decline in business: New York's imports were 27 per cent. less in 1876 and 21½ per cent. less in 1877 than in 1873, and a shrinkage of a hundred millions or more means disaster to many traders. But if we look at the figures for the other cities, and at the totals, we will see that New York's experience has not been peculiar. The total imports of the four ports were 28 per cent. less in 1876 and 24½ per cent. less in 1877 than in 1873. But we will understand the fluctuations better if we examine the percentages, which are given below:

Percentages of imports at Boston, New York, Philadelphia and Baltimore, for eight years.

Year.	Boston.	Philadel- phia.	Balti- more.	New York.
1870.....	12.6	3.9	5.2	78.3
1871.....	11.8	3.9	5.4	78.9
1872.....	13.1	3.8	5.3	77.8
1873.....	12.5	4.6	5.3	77.6
1874.....	10.4	5.3	5.8	78.5
1875.....	11.0	5.1	5.9	78.0
1876.....	9.4	5.7	5.7	79.2
1877.....	10.2	4.7	5.4	79.7
Total.....	11.5	4.6	5.5	78.4

Now what do we see here? Has New York's share of the import business declined of late years? Just the contrary is the case. Its share was smallest in 1873 and largest in 1877, and increased almost continually from 1873 to 1877. The variations are, however, very small, and the proportion has been so nearly constant for the eight years as to indicate that the differences in railroad rates have had very little, if any, effect on the imports at the different ports. When another port has gained it has not been at the expense of New York, but at that of one of the other three smaller cities. Of these only Philadelphia received a larger proportion in 1877 than its average proportion for the eight years, and its increase was but infinitesimal. So far as there has been any change it has been to the advantage of New York, which has received nearly four-fifths of the aggregate imports of the four ports.

This of course does not prove that there has not been a diversion of some branches of imports from New York; but it does show that whatever may have been lost in one direction has been gained in others.

Thus a demand for the railroads to increase the pro-

portion of imports through New York is equivalent to demand that they shall destroy the import business of the other ports.

The truth is, it is very much more difficult to divert imports than exports from any place which has long had an established business. The chief articles of export of this country are few in number and simple raw materials—cotton, grain, petroleum, meats and tobacco. There is little difficulty in supplying them by the cargo at any port which they can cheaply reach, and vessels will go wherever they can get cargoes at remunerative rates. There is a heavy export business at several southern ports, but no considerable import business south of Baltimore. For that are required capital, established firms, a great variety of business which will enable buyers to supply all their requirements in the single market, and the thousand small conveniences which are provided at great trade-centres, and are usually slow of growth and not easily transplanted. But as soon as a port which has no disadvantage in ocean rates has established a great machinery for bringing to it the export staples, it is sure of a considerable business when those staples are like those of this country—few in number and enormous in quantity. It may have been a mistake to provide the machinery, and it may be impossible to make it earn an adequate interest on the capital invested in it; but it is sure to be used if any income at all can be earned with it. While the percentages of the total imports of Philadelphia and Baltimore have been almost stationary, those of their exports have increased largely of late years, and this in spite of the great decrease of the difference in inland rates in their favor. This is partly because of the greater extent of territory reached by their railroads recently, but more, doubtless, because of the enormous decrease in through railroad rates of late years, which for the first time in the history of railroads have sometimes approximated the rates by the lakes and the Erie Canal, and so have tended to destroy the advantage which New York had as the sole terminus of the canal, an advantage which did more than anything else to establish its commercial supremacy.

REASONABLE THROUGH RATES.

We had supposed that by this time no one would or could complain that the through rates between the seaboard cities of the West are too high. Complaints of differences of rates have not been uncommon, especially when by a quarrel at one place it got its freight carried for less than cost while other places did not enjoy that privilege. But a committee of the New York Board of Trade and Transportation has recently made special complaint of the rates on west-bound freight, which since last February have been 75, 60, 50 and 40 cents per 100 lbs. for the four classes, from New York to Chicago. The reasons given for believing these rates to be excessive are, first, that the railroads are carrying fourth-class freight from Chicago to New York for 20 cents or less, and that the New York Central & Hudson River Company is paying 8 per cent. dividends on a capital in excess of the cost of its property. We are unable to see that the premises warrant the conclusion. We do not know that it was ever before set up that a railroad is bound to carry all its traffic at the lowest rate at which it carries any of it. The current lowest rate is about one-third of one cent per ton per mile. If the New York Central had carried all its freight at that rate last year, it would have had no net earnings instead of eleven and a half millions of dollars, and would only have been able to pay its working expenses because a net loss of about five and a half millions on its freight business would have been met by the profit on its passenger and miscellaneous business. It must be remembered that if the rate on the lowest class of freight is usually lower from the West to the East than from the East to the West, the reverse is true of the higher classes. The last regular tariffs made for the two directions were, in cents per 100 lbs.:

East-bound.....	120	90	70	50
West-bound.....	75	60	50	40

In the course of a railroad war the fourth-class east-bound rate has been reduced to 20 and 18 cents, and very likely to less. But if the west-bound rate on fourth-class freight should be reduced from 40 to 20 cents to equal the east-bound rate, it will be only fair to advance the west-bound rates on the three upper classes for the same purpose, and if this is done it will probably be acceptable to the railroads. And this suggests the fallacy of the whole argument. Why did the March tariff from Chicago to New York make the rate \$1.50 on first-class freight and only 25 cents on grain? Doubtless on the average there are greater expenses connected with the transportation of the first-class freight, but the excess of ex-

penses could not possibly amount to \$250 per car-load, or to more than a very small fraction of that amount. No merchant need ask for an explanation, for his daily practice familiarizes him with just such matters. Only 25 cents was charged for grain because the railroads could not get the grain at a higher rate, or thought they could not, and this rate was supposed to leave a slight margin of profit. Higher rates were charged on other classes because they could and would pay them. Like every merchant, the railroad accepts various rates of profit on different branches of its business, content if on the whole a reasonable profit is realized. Just now, apparently, it is impossible to make any profit on through freight carried to the East. But it does not follow that the railroads ought to sacrifice all profits on their west-bound business. Any corner grocer can enlighten us on this subject. Why should he not be confined to the same percentage of profits on teas and canned goods and the like that he gets on sugar? He will tell us that he makes nothing on sugar, or next to nothing, and he has his rent to pay. At this time east-bound freight is the sugar of railroad traffic. There is plenty of it hauled, but it does not contribute to interest, rents and dividends.

This is especially an unfortunate argument for New York merchants to make. If rates are to be equalized, their goods must pay more and not less. It is not simply a question between east-bound and west-bound rates, but much more between through and local rates. But rates are not to be equalized, and they cannot be equalized, though it is extremely desirable that some way may be contrived by which the through traffic may be made to contribute a larger share of the net earnings than it does at present.

The other fact, given as evidence that the west-bound rates are excessive, is that the New York Central Company divides large profits. Admitting everything that is claimed as to the large percentage of profits made on the actual cost of this road, the conclusion that for this reason through rates to the West should be reduced is most violent. Turning to our grocer again, we might as well say to him, if he is an exceptionally prosperous one, you are making 25 per cent. profit on the capital which you invested in your business twenty years ago; therefore it is only fair that you should reduce the price of flour. "Why flour?" he will be likely to ask, after protesting against any reduction in his profits. At best there is but a moderate profit on west-bound freight, and it is freight of the kind which can best afford to pay a profit. There is very little of it the consumption of which is decreased by the amount of the transportation charge when it is highest, and the diminution in the shipments of certain articles has been chiefly due to the establishment of the manufacture of them in the West. A very young man can remember the time when there were considerable shipments of cheese from Western New York to the Northwest. Train-loads of cheese are now hauled in the other direction. When a railroad is called upon to prevent a decline of business of this kind, the demand is virtually that it should set up a protective tariff in favor of the old country and against the new one. It is always best for a railroad manager to hear the community at both ends of his line before changing rates under such circumstances. In the case of the trunk lines, the West has something to say on such matters, and the West is big, has a loud voice, and will be heard.

But, through traffic aside, does it appear that the trunk lines are making extravagant profits? We cannot answer this by the results on the New York Central alone. The New York Central is but one road out of a dozen or more which carry the through traffic, and it carries but half of the distance between New York and the great traffic centre of the Northwest, and carries but one-third of the through traffic out of New York. The Erie, which carries as much from New York as the New York Central, pays no dividends and interest on only a very small proportion of its funded debt. The Pennsylvania Railroad has ceased to pay dividends. The Baltimore & Ohio, which has invested many millions in adding to its property without adding to its capital stock, has reduced its dividends from 10 to 6 per cent. The Great Western of Canada and the Michigan Central, which formed the northern connection of the New York Central with Chicago, have not paid dividends for years; the Lake Shore & Michigan Southern, which used to pay 4 per cent., half-yearly, paid 1 per cent. for the last half-year. The Atlantic & Great Western pays neither dividends nor interest. The Grand Trunk pays interest only on a very small fraction of its total capital. Taking the roads which carry the through traffic as a whole, their tale is one of disaster and not of prosperity. Their market value, as shown by the prices of their stocks and bonds, has declined, calculating roughly, as much as two hundred

millions of dollars since 1873, and yet because one of them has continued to be profitable it is gravely proposed, not by grangers unfamiliar with business and business principles, but by New York merchants, that a further reduction be made in the rates on a traffic carried by all of them. And the rates complained of are not high rates, but very low ones, such as were never known in this country until recently, now hardly to be matched in any European country, as the current east-bound rates certainly never have been anywhere.

Grain Movement by Lake and Rail.

In our issue of June 21 we examined the course of the shipments of grain from the eight leading Northwestern markets both by lake and by rail, for the five weeks from April 28 to June 1 for five years, those being the first five weeks of the season in which navigation had been fully open every year. We endeavored to ascertain what progress had been made in diverting the grain shipments from the lake vessels to the railroads by the very low rates that have prevailed recently, and especially in 1876 and 1878. We found that the great diversion that was effected by a 20-cent rate in 1876, when there was a great deal of grain to be moved, was not continued this year, with a heavy movement also, though rail rates were even lower, and we concluded that the railroads did not appear to be able to compete successfully with the lake vessels for grain going through to the seaboard.

We now have returns for five more weeks, and for the ten weeks that navigation has been open every year the figures are as follows:

Year.	By lake.	By rail.	Total.	Per cent. by rail.
1874.....	28,875,386	9,782,233	38,657,619	25.3
1875.....	18,176,834	10,042,748	28,219,582	35.6
1876.....	21,873,478	19,960,492	41,833,970	47.8
1877.....	18,078,975	8,336,406	26,415,381	31.6
1878.....	20,648,322	12,933,572	33,581,894	32.7

The railroads have carried more than one-half more this year than last, but the lake vessels have increased their traffic in about the same proportion, and the railroads have not carried two-thirds as much as in 1876, when the total shipments were a little larger. The total increase this year over last for the ten weeks has been 13,166,500 bushels, of which the railroads have got 4,597,200 bushels, or 35 per cent., and the lake vessels 8,569,300 bushels, or 65 per cent. Yet the rail rates have been probably, on the average, lower than was ever known before.

The advantage of the vessels has been greater in the last half of the period than in the first half, though rail rates were probably lower rather than higher in the last half. When we compared the shipments for the first five weeks in our issue of June 21, we found that this year the railroads had carried 37.4 per cent. of the total shipments. During the last five weeks their share was but 25.8 per cent. The total shipments for the last five weeks were about 7,300,000 smaller, but the rail shipments were not half as great as in the first five weeks. Comparing with the previous year, in the five weeks ending July 6, 3,173,000 bushels more grain in all were shipped from the Northwestern markets, but in the shipments by rail there was only an increase of 745,000 bushels, or but 23½ per cent. of the total.

It thus appears that not even by unprofitable rates have the railroads been able to divert a considerable portion of the grain from the lakes. This proportion has been smaller than in 1875, before the current low rail rates were dreamed of, and the amount is not one-third greater than in 1874 (when the total shipments were a little less), though the average rates received for carrying have been probably not half so great.

If all the grain shipped by rail had gone through to New York, we estimate that the gross receipts from it for the ten weeks this year could not have been more than \$1,250,000, which is shared by more than 4,500 miles of railroad. That there has been any profit to any of the roads from it, we do not believe, but at current rates those which carry the most of it even cannot have added very greatly to their gross earnings by this branch of traffic.

While the business of 1878 for the ten weeks cannot have brought in much more than about \$1,250,000 to the railroads between the Northwestern markets and the seaboard, that of 1874, which was a quarter less, probably brought them about \$2,100,000. The difference in the proportion of net earnings of course must be much greater, as there certainly was some profit from the traffic in 1874.

What Was Done at Saratoga.

There were two separate and distinct matters considered and acted upon at Saratoga last week, one being the settlement of the relations of Vanderbilt roads, and chiefly of the Michigan Central and the Lake Shore, with each other and to some extent with their connections, and the other a division of the St. Louis live stock shipments. As we said last week, the Michigan Central and the Lake Shore, the two

oldest roads to Chicago, have from the beginning been active competitors, and as such have maintained and have had to maintain formidable organizations to secure traffic as against each other. Now that the two roads have come under the direction of one president, it has for the first time become possible to discontinue these expensive organizations so far as they are not required from the competition with other roads. They include freight lines as well as agencies, and agencies at a large number of places off the lines of the roads. These can be consolidated where they cannot be discontinued, and so a considerable economy can be effected. It is not always remembered that these two roads have been competitors for a large part of their local freight as well as for that to and from their common terminus at Chicago. The Lake Shore's branches to the north and the Michigan Central's fewer branches to the south give both the companies stations at Detroit, Jackson, Albion, Kalamazoo, Grand Rapids and Lansing, Mich., and South Bend, Ind.; and the roads of other companies which cross these two lines increase somewhat the number of local competing points. A very large share of the local traffic of both roads in Michigan was thus subject to the competition which so often renders it wholly unprofitable. At Saratoga the business of these points was divided and the roads will hereafter be represented at them by a common agent, from which may be expected some increase in receipts and a decrease of expenses at once. But the heavy expenses for agencies have been at the large cities, especially in Chicago, New York and Boston. The concentration of agencies at these points is not yet, we believe, fully settled, but it is intended to effect it in some way. At most of the competing points one of the fast freight lines will represent both companies. And this suggests that the union of these two roads under one management will render a consolidation of freight lines possible. The Blue Line and the Red Line have been especially representatives of the two roads. Both run over the same roads from Boston and New York to Buffalo or Suspension Bridge. If the Michigan Central and the Lake Shore work together they will no longer need so many organizations of this kind, and doubtless will find economy in the simplification.

As to the relations of the Michigan Central with its old connections through Canada, Mr. Vanderbilt generously offered to leave to the arbitration of Mr. Thomas A. Scott the question of the division of traffic between the Great Western and the Canada Southern, and we understand that the Great Western has accepted this offer of arbitration.

Some of the newspapers have had the wildest and most extravagant stories to tell of what was to be done with the roads, even charging that the deliberate purpose had been formed to destroy the profits of the Lake Shore by aggrandizing the Michigan Central. What has been actually done has been to advance the interest of both companies by a considerable reduction of expenses, and by measures which will probably result in some increase of earnings. The rates on the greater part of the competitive traffic, of course, cannot be controlled by these roads alone, but even without a combination with other roads, working together they are in position to lessen the chances of some of the conflicts which have resulted in carrying a great deal of traffic without profit.

The live-stock business out of St. Louis has caused a great deal of trouble of late years. It has not been a very important business very long, and the competition for it has varied more than at Chicago, where it has long been a most important traffic. By the agreement at Saratoga the Chicago & Alton is admitted to a share of the traffic, sending its business east by the Michigan Central and the Canada Southern; but the percentage to be allotted to each line was left to be settled at a future meeting; but it will be settled by arbitration, we believe, if the several lines do not agree.

The work begun at Saratoga can be continued to advantage doubtless, and so far as the Vanderbilt roads are concerned doubtless will be. But it is also to be hoped, and by many it seems to be expected, that when the relations of the Lake Shore and the Michigan Central with each other have been adjusted, there will be another effort, and this time with good chances of success, to effect a general agreement for the division of east-bound traffic.

Drinker's Tunneling, Explosive Compounds and Rock Drills.*

Some time since an eminent engineer said to the writer that he preferred to finish his work and then read books on the subject; and, considering the very bookish quality of many of the works on engineering, the plan is not without its advantages.

The book of Mr. Drinker, copious extracts from which have appeared in these columns, is not, however, one that a tunnel engineer or contractor could advantageously neglect till the completion of his work. Instead of being born of an idea that a book on this subject would sell, its motive has apparently grown from the wants and experiences found in

"* *Tunneling, Explosive Compounds and Rock Drills*: Giving the details of practical tunnel work; the constituents and properties of modern explosive compounds; the principles of blasting; the history of the rise of machine rock-drilling, and detailed descriptions of the various rock drills and air-compressors in use. Also, descriptions of the European and American systems of timbering and arching, and tables giving the dimensions and cost of over seventeen hundred tunnels, from notes furnished by engineers and railroad companies in Europe, North and South America and New Zealand, with a history of tunneling during the thirty-four centuries succeeding the reign of Rameses II. By Henry S. Drinker, E. M., graduate of the School of Mines, Lehigh University; Member of the American Institute of Mining Engineers. Illustrated with about one thousand cuts set in the text, and several large folding plates, comprising geological and working profiles of the Nesquehoning, the Musconetcong and the Hoosac Tunnels, etc. etc. Quarto, pp. vi., 1,631, xlv. New York: John Wiley & Sons.

constructing a tunnel in exceptionally heavy ground, for this country. After citing, in his preface, Simms' admirable brochure on the English system of timbering, the author says:

"There is, however, at the present time, no treatise proper (in the English language) on tunneling considered as an art in itself. In Mr. Clark's edition of Simms' just referred to, and in many isolated publications running through the various scientific periodicals, and in the transactions of the English and American engineering societies, we have various accounts of the construction of individual tunnels, but no generalization of the principles involved, such as Rziha has set the example for in his 'Lehrbuch der Gesamten Tunnelbaukunst.'"

"Tunneling, however, is so eminently an art born of practical experience, that a mere statement of principles, without a comprehensive array of facts behind them, would be of little value. In an attempt to gain the latter, and to fill even partially the need of a work on the subject, the author has endeavored to interest his fellow-members of the profession in the preparation of the present treatise. Circulars and blank forms, in English, French and German, were prepared and distributed among the various railways of the world. Returns were duly received from the United States, Canada, Brazil, Peru, Chili, England, Australia, New Zealand, France, Germany, Norway, Sweden, Austria, Switzerland, Italy and Spain.

"* * * In addition, the author has endeavored to give (as will be seen in the chapters on European systems of work) the gist of the opinions expressed by the best European writers. The works of Rziha, Schoen, Lorenz, Zwick, Presel and Kaufmann, Becker, Fontenay, De Bauve, Lanino, Stapff, Serlo, Coladon and Traulz, with others, have been carefully gone over, and the portions thought to be capable of general application have been translated, and, where possible, condensed, and made part of the present work, credit having, of course, been given to the respective authors.

"The work covers in all a record of the lessons taught by the construction of nearly 2,000 (1,970) tunnels, and the author submits it to the profession with the earnest hope that, in passing judgment on the manner in which he has accomplished his task, the difficulties which have been encountered in its execution will be considered."

The responses received and the work applied are given in the 23 chapters into which the work is divided. Of these the first two are historical, embracing sketches of early tunnel works from the time of Rameses II., the controversy over the introduction of gunpowder, etc., and a very full chronological table showing the leading events in drilling and blasting to 1876.

Chapter III. deals with modern explosives—gunpowder, gun-cotton, nitro-glycerine, the various combinations of nitro-glycerine with absorbents or slower explosives, ending with a list of American patents. The distinction between detonations, or explosions of the first order, and simple explosions, or explosions of the second order, is clearly defined, and the author has made some valuable experiments on the effect of "dopes" or explosives proper when mixed with nitro-glycerine. It has been widely held that the addition of meal nitrate of soda powders, or substances of that kind, to nitro-glycerine could but decrease the force of the detonation. Others held that, as in ordinary blasting all of the powder was not burned, we did not know its strength, and that nitro-glycerine acted as a detonative having the same effect on a large charge of gun powder that a heavy fulminate cap has on a small charge, i. e., changing the effect from an explosion to a detonation. André, as cited by Drinker, page 73, says of lithofracteur (the remark applies, with more or less force, to all compounds of nitro-glycerine with a dope):

"One of the cases seems to have been reached 'in which the several ingredients are of such a nature and in such proportions that they are capable of acting toward each other in a manner that tends to promote rapid and perfect combustion'; that it is among the few of the compounds that have been tried which, 'based upon a true chemical knowledge, have in a more or less satisfactory degree attained the end proposed, and are likely to assume in the future an importance which is not yet accorded to them.'"

To satisfy himself fully as to the support given by the facts in the case to these theories, Mr. Drinker went, in June and again in September, 1877, to the factory of the American Giant Powder Company, and, with the assistance of experts, made careful trials, that are detailed with illustrations and discussed, pages 75 to 84. It would require too much space to give the experiments entire, interesting as they are. They may be summarized as follows: The experiments were of three kinds, viz., with a ball and socket, with a mortar, and with a pressure-gauge. The experiments of the first kind were not very important, except that they corroborated those that followed. With the mortar, ball weighing 28½ lbs., the following results were obtained:

"(1) Charge = 5 dwt. No. 2 dynamite. Ball thrown 620 feet.
 "(2) Charge = 48 grains nitro-glycerine. (This being the amount of pure nitro-glycerine contained in combination in 5 dwt. of No. 2 dynamite.) Ball thrown 385 feet.
 "(3) Charge = 5 dwt. rifle powder. (Hazard's American sporting powder, \$1 per lb.) Ball thrown 248 feet.
 "(4) Charge = 5 dwt. X X dynamite. (This dynamite was composed of only 4 per cent. of nitro-glycerine with an explosive base.) Ball thrown 256 feet.

"The latter two experiments were simply to show that a dynamite holding a very small percentage only of nitro-glycerine will, when mixed with an explosive base, give a blasting powder exceeding the best rifle powder in strength."

The pressure-gauge consisted essentially of an iron block in which a steel piston was fitted; a piece of iron with a cup-shaped cavity in the bottom, to hold the charge, rested on this; and under the piston truncated cones of lead were placed, the amount of shock communicated to the piston being registered by the compression of the cones.

"The small truncated cones of lead averaged in diameter at top 0.815 in.; at bottom, 0.797 in.; mean diameter = 0.806 in. The height of the cone was in each case carefully measured before and after compression by a micrometer screw measuring to thousandths of an inch.

"Each separate test was repeated a sufficient number of times to eliminate errors of accident."

The following table gives the result of the experiments

with the pressure-gauge in terms of the mean compressions of the cones:

	Mean compression in inches.
I. Charge = 1 exploder	0.175
II. (A) Charge, 75 per cent. nitro-glycerine, 25 per cent. infusorial earth	0.738
II. (B) Charge, 1.125 grammes pure nitro-glycerine	0.753
III. Charge, Nitro-glycerine, 75	0.770
Saltpetre, 20	
Sawdust, 5	0.703
Nitro-glycerine, 40	
IV. (A) Charge, Saltpetre, 48	0.601
Sawdust, 12	
IV. (B) Charge, 0.600 gramme nitro-glycerine	0.700
V. Charge, 0.900 gramme pure nitro-glycerine	0.588
VI. (A) Charge, 1.5 grammes XX powder	0.263
VI. (B) Charge, 0.09 gramme pure nitro-glycerine	0.056
VI. (C) Charge, 1.5 grammes American sporting powder, fired by fuse	
VI. (D) Charge, 1.5 grammes American sporting powder, fired by exploder	0.417
VII. Charge, 0.200 gramme pure nitro-glycerine	0.506
VIII. Charge, 0.400 gramme pure nitro-glycerine	0.516
IX. Charge given in IV. B.	0.644
X. Charge, 0.700 gramme pure nitro-glycerine	
XI. Charge, 0.800 gramme pure nitro-glycerine	0.672
XII. Charge given in V.	0.730
XIII. Charge, 1.0 gramme pure nitro-glycerine	

It will be observed that as between IV. (A) and V. "a charge of 0.900 gramme of pure nitro-glycerine gave practically the same compression as a charge of 1.5 grammes of the mixture IV. (A). * * * We therefore see that as the proportions of pure nitro-glycerine in IV. (A) and V. are as 6 : 9, that in IV. (A) the nitro-glycerine does two-thirds of the work; in other words, that an explosive dope composed of 1 sawdust to 4 saltpetre, when mixed in the proportion of 40 parts of nitro-glycerine to 60 of dope, adds one-half to the effective strength of the nitro-glycerine. This compound is the ordinary commercial giant powder (or dynamite) No. 2." "The tests, from VII. to XIII. inclusive, serve no practical object except to show or gauge the pressures exerted by the increasing charges used."

Of the preceding experiments Mr. Drinker says:

"The above trials appeared to so conclusively demonstrate the fact that an explosive dope does add effective strength to a nitro-glycerine compound, that it did not seem necessary to pursue the question further."

And, until more exhaustive and carefully-conducted experiments show to the contrary, the above must be regarded as a conclusive settlement of the question.

In this connection it is of interest to note that in December last the Atlantic Giant Powder Company, in a suit for infringement against a vender of vulcanite, obtained a decision from a judge in Massachusetts to the effect that meal powder in connection with nitro-glycerine is inexpensive. This decision will probably go down to posterity with that of the New York judge who decided that the Gilbert Elevated Railroad was a tubular structure. It also destroys all interest, except to the historian, in dynamites not manufactured by the Atlantic Giant Powder Company, apparently stopping any one else from manufacturing or using any blasting compound composed in part of nitro-glycerine, unless it may be nitro-glycerine and fulminate of mercury.

The available knowledge as to the strength of nitro-glycerine and its different compounds under varying conditions of detonators, temperature and moisture is very meagre, it having been largely used by men incapable of either generalization or analysis, and it is to be regretted that Mr. Drinker did not continue his experiments until he had covered detonators of different weight and varying quantities of fulminate of mercury and chlorate of potash, and tested the effect of low temperature and water on nitro-glycerine and dynamites. The use of dynamites, on account of their greater efficiency, safety and cheapness, is now so universal that the experiments would be of general interest, and no one who has closely watched blasting operations needs be assured of the economical advantages that would accrue from experiments conducted with the same intelligence and care as those referred to above.

Chapter IV. is on the principles of blasting, with notes on the progress made in tunnels driven by hand labor and black powder.

Chapter V. treats of air compressors and machine rock-drills, going very fully into the history and rationale of both subjects with the aid of about 70 illustrations. The various compressors, boring machines, percussion and diamond drills are taken up and the weight, pressure, length of stroke, valves, moving parts, chucks and bits are discussed from both the theoretical and practical standpoint.

In regard to the weight of drills, the author says:

"If the machines are mounted on frames or carriages, and moved on wheels, we would say make the machines very heavy; but if they are to be portable, and frequently dismounted in moving them, then they should be as light in weight as can be made consistent with simplicity in construction and strength in every part." The necessity for properly disposed weight should have been more strongly accented. No one, probably, doubts its advantages for machines mounted on carriages, but in the case of tunnels or other large works, extra machines are almost always on hand; while as portable machines are generally used no extra ones are procured, and breaks entail stoppage of the work until repairs are made, the use of a derrick and a heavier machine would generally result in an economy. Inventors have nearly ruined themselves and manufacturers have injured their customers by the extreme lightness and consequent weakness of the machines they have sent out.

The chapter ends with a list of American and English drill patents.

These three chapters refer to open-cut rock work as well as to tunneling, and will probably be found of more general interest and value than any others.

Chapter VI. contains very full memoirs on the Nesquehoning, Musconetcong, Hoosac, Sutro, Mont Cenis and St. Gothard tunnels. Commencing as it does with the use of power drills

and black powder in the Nesquehoning Tunnel, it brings the narrative to the present time, recording the best practice with the American system of centre-cut blasting, and gives abundant data for comparison with the European practice in the Mont Cenis and St. Gothard tunnels. This chapter alone would form a better treatise on rock tunneling than anything heretofore attainable by an English reader.

The portion of the work, however, of most interest to tunnel-men and miners is comprised in Chapters VII. to XIII., including treating of the various systems of timbering, arching centres, with a comparison of the English, Belgian, German, and Austrian and American systems of timbering and excavating. To this the author has devoted over 400 illustrations and about the same number of pages, giving very full illustrations, both by cuts and text, of the capabilities and failures of the various systems, and tables of the amount of timber used. The chapter on the principles of timbering is very clear and succinct, and while there is no attempt at fine writing, even a non-professional reader will not lay down the description of the Cristina Tunnel until he has read it through.

Chapter XIV., on shaft building, in addition to notes on sinking and timbering ordinary shafts, gives clear statements of the Guibal, Kind-Chandron and long-hole or diamond-drill system as practiced in the Pennsylvania coal regions.

Chapters XV., XVI. and XVII. treat respectively of "Open-Cut Tunnels and Portals," "Reconstructions and Enlargements" and "Breaks and Falls."

Under the head of "Sub-Aqueous Tunneling," we have described, in Chapter XVIII., the Thames tunnels, the various tunnels built by Mr. Chesbrough, and the particularly unfortunate one on Mr. Chesbrough's plan built at Cleveland.

Chapter XIX. gives illustrations of tunnel cross-sections, and Chapter XXIII. is tabular, giving about all the desirable data regarding the depth, grade, material, cost, etc., etc., of over 1,700 tunnels.

The remaining chapters are devoted to "Geological Considerations," "Tunnel Ventilation" and "Tunnel Surveying." In regard to the latter subject, the author says:

"If there is any branch of engineering more than others in which there is no royal road for the engineer, it is that of tunneling. A veteran in the profession (Mr. W. Milnor Roberts) once said on this point to the author: 'From the laying out of a line of tunnel to its final completion, the work may be either a series of experiments (made at the expense of the proprietors of the project, or a series of judicious applications of the results of previous experience. No rigid rules can be established in advance. The engineer must grasp all the known, probable and possible circumstances of each case, and act accordingly. Good judgment, aided by appropriate experience, must be the principal dependence for a safe solution of any such problem. If this be lacking, failure may easily happen. In fact, in regard to all civil engineering, the first requisite is good judgment, the second requisite is good judgment and the final requisite is GOOD JUDGMENT. A canal or railroad company may secure this in two ways—one by paying for an engineer who has it, the other by paying an engineer and his cost in getting it.'"

Also "our contractors in America have been so far largely our true tunnel engineers, and with them the details of the work have frequently to be left to subordinates, who work on a strict rule-of-thumb principle. A contrary rule has prevailed in Europe, especially on the continent: there contract work is as much in favor as here, but the supervision and direction of all the work is in the hands of thoroughly educated, experienced engineers, and the consequence has been that the principles of tunneling have been more carefully studied out. When a difficult piece of work has been met, its record has been laid up for future general use, not entombed as a trade secret in the breast of the contractor who built it; the ultimate result of this enlightened policy has been to largely decrease the dangers and cost, as well as the time consumed in tunnel construction."

While acknowledging the author's greater experience, his reviewer would take exception to the first clause in the foregoing sentence, having found that generally while the contractor is a first-rate engineer when the work goes smoothly, he on the appearance of real danger retires to his office and allows the engineer the option of either assuming charge of work until the difficulty is surmounted, or standing the delay and expense of a re-letting, emerging, however, in time to go before the directors and claim extra compensation for the danger and distress he has suffered during the break.

Under the head of the junction of the lines, we are told that east and west of the central shaft into Hoosac Tunnel the variations were $\frac{1}{8}$ and $\frac{1}{16}$ of an inch, or 1 in 130,557; the error in Mont Cenis was 10 times this. It may be doubted from reading of the care taken to insure this accuracy if the expense necessary to accomplish it did not exceed the probable saving.

The chapter ends with notices of experiments made on the vibration caused by railroad trains passing through tunnels, which will be of melancholy interest to those property-owners on Sixth avenue who remember the possibilities of the Central Underground.

In an appendix will be found a reprint of the report to the American Society of Civil Engineers on the classification of masonry, and specifications for the Musconetcong, the Greenfield (Chicago, Milwaukee & St. Paul Railway), the Chesapeake & Ohio tunnels, both for rock and earth, the Cincinnati Southern, the Hoosac and the Lake tunnels at Chicago and Cleveland.

A marked feature of the book is the great number of tables of progress, quantities, cost, etc., and a very full bibliography of the subjects written of. The alphabetical index is very full, and so far as examined, correct.

This is understood to be Mr. Drinker's valedictory to the profession, and in it he has more than satisfied any expectations that might have been raised by the perusal of his modest preface, giving the profession a thoroughly practical work in which the sequence of cause and effect is not lost sight of. There is apparently but one subject that could, with propriety, have been treated more at length, i. e., the

notice of the various batteries used in exploding group and mine blasts. It is a pleasure to commend the work for its fullness and logical arrangement as well as the industry displayed in its production.

Whatever the pecuniary reward may be, the author will have the satisfaction of having produced a standard authority on the subject.

A book of more than a thousand quarto pages on heavy paper naturally makes an imposing volume. The profusion with which it is illustrated may be judged by the fact that the last plate in the volume is numbered 1,086, and some of the large folding plates are not numbered. The engravings, too, are really illustrations. Most or all of them are executed by a photographic process, and some, especially those of machinery on a small scale, are not well printed, but in all or nearly all cases they are perfectly clear, and altogether the book makes an appearance creditable to the publishers—with a handsome, clear, slightly tinted page with wide margins, and neat and strong half-morocco binding, befitting what we may call a monumental work, which will be the world's great treasury of information on the subjects treated in it.

The standards of measurement and value adopted, are the foot and dollar. Measurements, however, have been translated into meters, which will render the information accessible to members of the profession who live in Boston.

Record of New Railroad Construction.

This number of the *Railroad Gazette* contains information of the laying of track on new railroads as follows:

Junction & Breakwater.—The *Rehoboth Branch* is completed from Lewes, Del., east by south to Rehoboth Beach, 6 miles.

Lake Erie & Louisville.—The *Celina Division* is extended west to Celina, O., 5 miles.

Indianapolis, Decatur & Springfield.—Extended from Montezuma, Ind., east by north to Bruin, 19 miles.

Grayville & Mattoon.—Extended from a point two miles north of Prairie City, Ill., northward to Mattoon, 18 miles.

Chicago, Milwaukee & St. Paul.—The *Iowa & Dakota Division* is extended from Algona, Ia., west to Emmetsburg, 25 miles.

Chicago & Alton.—Track on the *Kansas City Extension* is laid for 27 miles southwestward from Mexico, Mo.

This is a total of 100 miles of new railroad, making 791 miles completed in the United States in 1878, against 710 miles reported for the corresponding period in 1877, 846 in 1876, 457 in 1875, 727 in 1874, and 1,578 in 1873.

LOCOMOTIVES FOR STREET RAILROADS were treated at the recent session of the British Society of Mechanical Engineers at Paris in a paper by M. Mallet, a French engineer, who designed the compound locomotive used on a French watering-place road, which we illustrated a few months ago, and who seems to make a special study of locomotive engineering. In his paper he discussed the compressed air, hot-water and simple steam engines which have been used in Europe, and came to the conclusion that the chief requisites of an engine fitted for street work are a boiler of large capacity, chiefly as a storehouse of steam when it must be used faster than it can be made; a motive apparatus consisting of two cylinders of unequal sizes, to be worked as a compound engine, except when exceptionally great power is required, as in starting and on grades, when steam could be used directly in both cylinders; such a disposition of the mechanism as to keep it as high as possible above the ground, and protected from dust and mud; as few axles as possible, and those as close as possible, to enable the engine to run around short curves, and he thought that two driving axles coupled would always be enough, and that one would be better with a level track, when the engines might never need much exceed 13,000 lbs. in weight. A condensing apparatus he believed to be needless; the noise of the escaping steam could be sufficiently diminished by the use of numerous orifices, or by the arrangements already in use, and if coke were used, neither steam nor smoke need be troublesome. In the discussion that followed much stress was laid on the great tractive power needed on street railroads as compared with ordinary railroads. Mallet had said that while 9 to 10 lbs. tractive were sufficient to move a ton on a railroad, at least 16½ lbs. were required on a tramroad, and often 22 to 26 lbs. But Mr. Charles Brown, of the Winterthur Works, said that the resistance sometimes was as much as 44 lbs. per ton. Mr. Hughes, of Loughborough, whose street engines are perhaps more used than any others in Europe, said that in Glasgow the cost of hauling by his engine was about 11½ cents per mile, and by two horses it was 14 cents a mile. But he expressly stated that the locomotives could not compete with one-horse cars, meaning, doubtless, where but one car can be hauled at a time. Mr. Holt, who has charge of the twenty Harding engines which have been running on the Paris tramways, urged the need of having the machinery in sight. Many breakages had occurred because they had not seen in time where repairs were needed. The rails in use were not solid enough for engines, and they were not in good surface, successive rails being of different heights. In Paris the cost of hauling was more than 13 cents per mile, and the high cost was largely due to the rapid wear caused by the dust. It often happens that after running three weeks at the rate of 375 miles per week, it is necessary to change all the journal bearings of the engine. Independent engines were much preferable to steam cars.

CHEAP EXCURSIONS have become very common about New York this year, including journeys as short as to Coney Island, and as long as to Albany and Saratoga. Most of

these are by water, though the railroads offer cheap trips on several lines. There has been a great increase in the boats engaged in the excursion business to Coney Island and Rockaway, the distance to the first place being about ten miles, and to Rockaway twice as far by water. Very fine steamers now sell round-trip tickets to Rockaway for 25 cents; one of the railroads from Brooklyn to Coney Island has reduced its charge for the round trip from 40 to 35 cents, which, however, is not a very low rate, considering that the distance is less than six miles. But the Long Island Railroad offers really cheap transportation with its round-trip tickets to Rockaway for 25 cents, the distance being 20 miles or more. This is a business which can be enormously increased by low rates, and low rates for passengers, with large trains and full trains, will pay. In this case, however, the steamboats hardly leave the railroad any alternative, for they not only offer a cheap ride, but a most beautiful and refreshing one, part of it being on the open sea. On the Hudson, too, cheap traveling is to be had. A fine boat takes passengers from New York to Newburg (60 miles) and return for 50 cents. But the climax of cheapness is capped by the regular night boats to Albany and Troy; one line advertises deck passage at 25 cents and the other at ten cents for the 150 miles. It is well to observe, however, that there are, and will be, few deck passengers on any terms; the great bulk of those who travel preferring and being able to pay for a place to sleep when they travel at night. But one of the lines charges but 50 cents for cabin passage, and the other, whose boats are palaces, but a dollar, and \$1.50 for the round trip, and in connection with the Delaware & Hudson's railroad line from Troy to Saratoga, it makes a rate of \$1.70 from New York to Saratoga, 32 miles being by rail. To the eastward also there is an epidemic of cheapness, inciting all New York to go to Boston, and all Boston to go to New York. The advertised rate by steamboat to Stonington, Providence or Fall River, and thence by rail, being \$1.50, to which most travelers will add the price of a state-room. Some of these boats have no rivals for elegance, except on the Hudson, and hardly there. Probably most of the travel between New York and Boston is by the rail and steamboat lines, as by them the journey can be made in the night with great comfort, but the reduction in the rate this way (it has usually been \$5, instead of \$1.50), does not seem to have affected the all-rail Boston rate.

FINANCING is usually a very costly operation with new railroads in this country, and it has often been the subject of remark that English companies had an immense advantage because they could always get money easily. But the case of a sick English company where Sir Edward Watkin was recently called in to consult indicates that even at the financial centre of the world brokers' commissions may make frightful inroads in the capital raised for construction. The East London was the company, which in raising about \$17,000,000 had expended about \$5,000,000 for discounts, financial agents' charges and commissions, and interest. In 1872 the company began to raise money through Baron Grant, or rather it would seem that Baron Grant began to raise money through the company. Since that time for the conduct of the operations by which the company realized considerably less than \$5,000,000, he received \$860,000, or an average of 17 per cent. From one issue of debenture stock the company realized \$450,000 and Baron Grant \$100,000.

NEW PUBLICATIONS.

The Railway Builder: A handbook for estimating the probable cost of American railway construction and equipment; by Wm. J. Nicolls, Civil Engineer. Philadelphia: Henry Carey Baird & Co.

This is a very neat little pocket volume of 231 pages, 3½ × 5½ in. The author states in his preface that "the work has been prepared, not for the critical *savant*, but for the daily use of practical railroad men, those not conversant with engineering formulas or manufacturers' processes, to enable them to familiarize themselves with the subject and to assist them in estimating the probable cost of constructing and equipping an American railway." In this statement the author has, to a certain extent, disarmed criticism. The *savant*—by which is presumably meant the skilled railroad man—is warned off at once. But though we have no right to complain of incompleteness, it is always reasonable to demand, first, that all explicit statements shall be correct; and, secondly, that all generalizations shall tend to convey correct impressions. We regret to say that the treatise before us is open to criticism in both these respects.

The author treats of "Field Operations" (26 pp.), "Preliminary Surveys" (12 pp.), "Cost of Earthwork" (36 pp.), "Permanent Way" (58 pp.), "Frogs and Switches" (51 pp.), "Equipment" (30 pp.), and "Depôts and Structures" (11 pp.). The subject of "Frogs and Switches" is well presented and quite complete. The author has evidently given special attention to the subject, and we do not know where an equal amount of information on the subject can be found in a smaller space. In less degree the same is true of the chapter on "Permanent Way." It will give the inexperienced projector an excellent general knowledge of the subject in a readable and systematic form. The same may be said of some parts of the chapter on "Equipment." The chapter on "Cost of Earthwork and Tunnels" is thoroughly good, being an abridgment from Trautwine's article on the subject (which leaves little more to be said), with the addition of some useful notes as to some tunnelling on the Reading Railroad.

But having said this much, we know not what else to approve, and we feel bound to protest against the growing tendency to apologize for careless preparation by deprecating the criticism of that much abused non-descript, "the

savant. We note several very obvious errors in statements of fact. Thus, on page 98 we are told that "old rail can readily be disposed of for at least two-thirds of its original cost. Immediately thereafter we are told that "iron rails are worth about \$35 per ton at the mills," and "old iron rails are worth \$19 per ton at the mills." On p. 124 we are told that "trestles cost only about one-half the price of embankments," which is correct for but one depth of fill. On p. 191 we are told that the distance between centres of front and back drivers of Mogul engines is "96 inches," an error which has been copied *verbatim* from Forney's "Catechism of the Locomotive," and on page 194 that "the tenders of engines will weigh about 6 tons empty and about 15 tons full of water and fuel." It would be a moderate average to increase these weights 50 per cent. On the following page we are told that a passenger car for 60 passengers "will weigh, when empty, about 15 tons," which should be at least 4 tons greater; and immediately thereafter that "box cars measuring 30 feet in length and 9 feet wide will weigh about eight tons, and gondola cars of the same dimensions about 7 tons," whereas a fairer average would have been 28 ft. by 8 ft. 6 in., and at least one ton greater weight. Finally, the last sentence of the book is that "a good timber farm bridge, crossing a single track, can be built for about \$500." Such a bridge will not contain more than 10 to 15 M. ft., B. M., of timber, and can be built, at present prices, for from \$200 to \$300. This brings us to the most serious general criticism on the plan of the volume. It is ostensibly prepared as an aid for "estimating the cost" of railroads, yet throughout the volume (with one or two exceptions) the prices given are a single round sum, without any of those details which are absolutely necessary to render such quotations of permanent value. Breaking stone for ballast, we are told, "will be about \$700 per mile of single-track road;" "culvert masonry will cost about \$3.50 per cubic yard;" "the approximate cost of trestling, where the height is not more than 30 feet, is about \$6 per running foot;" "a way station, so arranged that one-half of it can be occupied by the agent and his family need not cost more than \$3,000 to \$5,000" (we should hope not; half of this would be a liberal estimate). This style of quoting prices becomes worthless almost as soon as it is printed. To render such a book of permanent value, details must always be given, such as quantities of labor and material, fluctuations in prices, etc., etc. Many of the most important expenses, moreover, have no prices quoted whatever; as, for example, iron and wooden bridges (a most singular omission), quarrying, bridge and arch masonry, ballasting with gravel, shops, signals, train brakes, and earth-work done with scrapers, trains or steam shovels. The author seems, in fact, to have followed no systematic plan, but to have inserted only such matter as lay within his own personal knowledge, or was immediately accessible. Thus, the whole subject of trestling, bridge-work and masonry is inserted, apparently, by an afterthought, at the end of the chapter on permanent way. In these few pages two working plans of structures are given, which are the more conspicuous because they are the only similar instances in the work, and both of these plans must be unqualifiedly condemned as types of construction. One of them is for a style of two-pile bent trestle, which has passed completely out of date, the preference being given for the safer plan of a four-pile bent, with long caps and ties, and the other is for a wharf foundation, "executed under the immediate supervision of the writer," which shows a timber foundation for masonry extending some 10 inches above low-water mark. We should also feel bound to criticize Mr. Nicoll's remarks on location, but we have left ourselves no room. We will only observe that, although we have the usual vague generalities as to incompetent engineering, Mr. Nicoll's enlarges with most emphatic detail on the necessity of securing the right of way before construction.

We have thus pointed out, at some length, what we deem the special defects of this volume, but we will add our belief that no abridgment of this character can be a safe and useful guide for those who aspire to be "practical railroad men," although it may furnish an hour's pleasant reading to the enquiring amateur, especially when, as in the present case, the book is attractively printed and bound. There is no royal road to technical knowledge, and certainly not to knowledge of so intricate a subject as railroad construction. Such a book may be ever so simply expressed (for simplicity by no means involves incompleteness), but we should be inclined to apply to our author's whole subject the words which he applies to bridge construction only: "No abridgment of so important a subject will be at all satisfactory to an engineer, and is of very little use to the unscientific reader."

General Railroad News.

MEETINGS AND ANNOUNCEMENTS.

Dividends.

Dividends have been declared as follows:
Central Ohio (leased to Baltimore & Ohio), 3 per cent. on preferred and 2 per cent. on common stock, both semi-annual, payable July 29.
Panama, 3 per cent., quarterly, payable Aug. 1.
Louisville & Nashville, 1½ per cent., semi-annual, payable Aug. 10.

Foreclosure Sales.

The Omaha & Northwestern Railroad will be sold in Omaha, Neb., Sept. 3, under a decree of foreclosure granted by the United States Circuit Court at suit of the Union Trust Company, trustee. The sale will include the road from Omaha to Tekama, 47 miles, with all its appurtenances, and sundry parcels of land in Nicolls and Antelope Counties in Nebraska. The bonds outstanding under the mortgage amount to \$618,000, on which no interest has been paid since 1874.

The sale of the Detroit & Milwaukee is now advertised to take place in Detroit, Mich., Sept. 3, according to the terms of the decree of foreclosure, a summary of which we lately published.

Thomas G. Smith, Receiver of the Whitewater Valley road, will sell in Cincinnati, July 20, the equipment of that road, consisting of 4 locomotives, 2 passenger, 1 baggage, 70 box, 30 stock, 30 flat, 30 coal and 2 caboose cars, and one set of air brakes. The road was sold under foreclosure May 2.

The Narrow-Gauge Convention.

Pursuant to the call the convention met in Cincinnati, July 17, the meeting place being changed from the Grand Opera House to the Lookout Opera House, on account of the extreme heat. About 200 persons were present when the convention was called to order by Col. E. Hurlbert, Chairman of the Committee which called it. He made a brief address, setting forth the object of the Convention. Mr. S. N. Yeomans, of Washington Court House, O., was chosen Chairman, and Maj. John Byrne, Secretary. An address of welcome was then made by Hon. S. F. Covington, President of the Cincinnati Board of Trade, after which the convention adjourned till afternoon.

At the afternoon session committees were appointed on Rolling Stock and Machinery, on Operating Expenses, and on Resolutions. An adjournment was then had to the next day.

Green Line Meeting.

A meeting of the Executive Committee of the Green Line was held in Atlanta, Ga., July 10. There were present Virgil Powers, Chairman; L. P. Grant, Superintendent, Atlanta & West Point; G. J. Foreacre, General Manager, Atlanta & Charlotte Air Line; S. S. Solomon, Superintendent, South Carolina Railroad; Wm. McRae, General Manager, Western & Atlantic; M. H. Smith, General Freight Agent, Louisville & Nashville; G. R. Knox, General Freight Agent, Nashville, Chattanooga & St. Louis; S. K. Johnson, Superintendent, Georgia Railroad; R. C. Robson, General Agent; T. E. Walker, Secretary.

The meeting was called to regulate some minor points of differences and to make arrangements for the fall business. The meeting was harmonious and all differences were adjusted without trouble. It was decided to make no change in freight rates at present.

Land Commissioners' Association.

An adjourned meeting was held at the Palmer House, Chicago, July 10, the following gentlemen being present: A. S. Johnson, Atchison, Topeka & Santa Fe; Peter Daggy, Illinois Central; J. B. Calhoun, Iowa Railroad Land Company; U. D. Stock, Little Rock & Fort Smith; John A. Clark, Missouri River, Fort Scott & Gulf; James B. Power, Northern Pacific; U. A. Kendall, St. Louis, Iron Mountain & Southern; Herman Trott, St. Paul & Pacific; U. H. Coffin, St. Louis & San Francisco. Mr. Trott was also authorized to represent the St. Paul & Sioux City and the Sioux City & St. Paul. Mr. J. B. Calhoun presided, and Mr. U. A. Kendall acted as Secretary.

The report of the Executive Committee was deferred, owing to the absence of Mr. E. A. Touzalin. The Committee on Immigration, Colonization and Transportation made a partial report setting forth the advantages of land grants and the great amount of business they had brought to railroads in the Northwest.

The Committee on Terms of Sale and Treatment of Delinquents made a partial report, recommending that delinquents of good character and industrious habits, who are disposed to act fairly, should be treated leniently and encouraged as far as possible. Others should not be cared for. The Committee on the advantages of Land Grants made a report setting forth the benefits resulting therefrom both to the Government and the people.

After discussing the reports and disposing of routine business, the Association adjourned to meet again in Chicago on the second Wednesday in November next.

Convention of Railroad Commissioners.

The call for a convention of State Railroad Commissioners, to be held in Columbus, O., Nov. 12, has been approved by the Commissioners of Ohio, Illinois, Iowa and Missouri.

ELECTIONS AND APPOINTMENTS.

Atchison, Topeka & Santa Fe.—Mr. Sargent, formerly General Freight Agent, has been appointed General Agent, with headquarters at Kansas City, Mo.

Boston & Hoosac Tunnel.—The Boston, Hoosac Tunnel & Western Company has completed an organization in Vermont under this name, and with the following officers: President, W. L. Burr; Clerk, James C. Barrett, Rutland, Vt.; Treasurer, Fred. L. Ames.

Georgetown Branch.—At a meeting held in Kingstree, S. C., July 2, this company was organized with the following officers: President, James D. Blanding; Directors, A. Morgan, R. Dozier, H. Kaminski, A. J. McQuaid, R. E. Frazer, James McCutchen, W. J. Lee, D. Risley, Gaither Pearson, G. W. Reardon, R. W. Lee; Secretary and Treasurer, R. L. Fraser.

Mineral Range.—At the annual meeting in Hancock, Mich., recently, the following directors were chosen: S. North, R. M. Hoar, James A. Close, J. A. Hubbell, C. E. Holland, Peter Ruppe, J. H. Chandler, Jacob Baer, M. M. Moralee, M. L. Cardell, J. R. Devereaux.

Missisquoi & Black Rivers.—At the annual meeting in Richmond, P. Q., July 2, J. H. Graham was chosen President, and Erasmus Lawrence, Vice-President.

Niagara Falls Suspension Bridge.—At the annual meeting in Niagara Falls the following directors were chosen: J. M. Hutchinson, Delos DeWolf, Samuel B. Johnson, Warren Bryant, Charles H. Smythe. The board reflected J. M. Hutchinson President; Charles H. Smythe, Secretary and Treasurer. The Clifton Suspension Bridge Company met at the same time and elected the same directors, with Delos DeWolf, President; Charles H. Smythe, Secretary and Treasurer.

North Carolina.—At the annual meeting in Hillsboro, N. C., July 11, the following directors were chosen by the stockholders: Thomas M. Holt, H. W. Fries, M. L. Holmes, Dr. R. B. Haywood. The reappointment of the old State directors was announced, as follows: J. L. Morehead, A. Barwell, Kerr Craig, John A. Gray, J. W. Graham, R. F. Hoke, W. F. Korneygav, Donald McRae. The board reflected Col. Thomas M. Holt, President; W. L. Thornburg, Secretary and Treasurer.

Pemberton & New York.—The Chancellor of New Jersey has appointed Col. I. S. Bucklew Receiver in a suit brought to foreclose the mortgage on this road. Col. Bucklew is Superintendent of the Amboy Division, Pennsylvania Railroad.

Philadelphia & Atlantic City.—The Chancellor of New

Jersey has appointed Charles R. Colwell, of Weymouth, N. J., Receiver. He is President of the company.

Portsmouth, Great Falls & Conway.—At the annual meeting in Portsmouth, N. H., July 9, the following directors were chosen: John Cumrock, Great Falls, N. H.; George E. B. Jackson, Portland, Me.; Willard S. Phillips, Salem, Mass.; Samuel C. Lawrence, Medford, Mass.; Alfred P. Rockwell, Boston. The road is leased to the Eastern.

Providence, Brookfield & Hoosac Tunnel.—This company has been provisionally organized by the election of the following directors: Wm. S. Slater, Providence, R. I.; James H. Howe, Webster, Mass.; A. J. Bartholemew, Southbridge, Mass.; Noah D. Ladd, E. L. Bates, Sturbridge, Mass.; Chas. U. Prouty, Spencer, Mass.; John E. Prouty, Charles O. Brewster, George W. Johnson, Brookfield, Mass.; Charles B. Pratt, George R. Spurr, John Gilman, Worcester, Mass. The board elected George W. Johnson President; A. J. Bartholemew, Clerk.

Rochester Southern.—The officers of this new company are: President, John R. Cook; Vice-President, F. T. Olds; Secretary, Milton J. Daniels; Treasurer, Thomas Brooks. Offices at Rochester, Olmsted County, Minn.

Saginaw Valley & St. Louis.—At the annual meeting in Saginaw City, Mich., July 10, the old board was reelected, as follows: Newell Barnard, L. H. Eastman, James Hay, Benton Hanchett, H. L. Holcomb, D. H. Jerome, George Jerome, T. Jerome, A. Rust, E. Rust, Joseph E. Shaw, George F. Williams, A. W. Wright.

Sonoma Valley.—The first board of directors of this new company is as follows: E. T. Anthony, Wm. Corcoran, A. K. Grim, Jonathan Kittredge, Joseph S. Kohn, Wm. M. Pierson, Peter Taylor. The board elected Peter Taylor, President; Wm. J. Cady, Secretary; E. F. Anthony, Treasurer. Office at Sonoma, Cal.

TRAFFIC AND EARNINGS.

Earnings for various periods are reported as follows:

Six Months ending June 30:					
	1878.	1877.	Inc. or Dec.	P. c.	
Denver & R. Grande	\$436,705	\$306,137	I.	\$130,568	42.7
Ind. Bloom. & West.	614,307	579,396	I.	34,911	6.0
Scioto Valley	117,714				
Five Months ending May 31:					
Atlantic, Miss. & Ohio	\$641,716	\$628,109	I.	\$13,607	2.2
Net earnings	160,171	156,922	I.	3,249	2.1
Per cent. of exps.	75.01	75.03	D.	0.02	
Burlington & Mo. Riv.	444,491	344,672	I.	99,819	28.7
Net earnings	68,447	181,342	I.	227,125	125.3
Per cent. of exps.	36.45	47.34	D.	10.89	22.6
Clev. Mt. V. & Del.	150,831	149,464	I.	1,367	0.9
Net earnings	29,713	29,675	I.	38	0.1
Per cent. of exps.	80.21	80.40	D.	0.19	0.2
Dakota Southern	86,344	65,724	I.	20,620	31.4
Net earnings	42,206				
P. c. of expenses	51.32				
Kansas Pacific	1,212,452	1,092,393	I.	120,059	11.0
Net earnings	358,630	442,161	D.	83,531	18.9
P. c. of expenses	70.45	59.55	I.	10.90	18.3
Missouri, Kansas & Texas	1,048,246	1,172,810	D.	124,564	10.6
Net earnings	152,288	412,726	D.	260,438	63.1
P. c. of expenses	85.49	64.80	I.	20.69	31.9
Nash. Chat. & St. L.	730,140	693,555	I.	36,585	5.3
Net earnings	259,106	273,450	D.	14,344	5.3
P. c. of expenses	64.52	60.54	I.	3.98	6.6
Paducah & Memphis	86,068	73,699	I.	12,369	16.8
Net earnings	21,413	17,061	I.	4,352	25.5
P. c. of expenses	75.18	77.08	D.	1.90	2.5
St. Louis, Iron Mt. & Southern	1,614,468	1,657,977	D.	43,509	2.6
Net earnings	593,926	682,232	D.	88,306	14.2
P. c. of expenses	63.23	58.25	I.	4.98	8.5
Southern Minnesota	320,350	172,072	I.	148,278	86.2
Net earnings	185,541	38,545	I.	146,996	381.8
P. c. of expenses	42.02	77.63	D.	35.61	45.9
Wabash	1,886,818	1,705,223	I.	181,595	10.6
Net earnings	488,690	335,575	I.	153,115	45.6
P. c. of expenses	74.10	80.33	D.	6.23	7.8
Four Months ending April 30:					
Grand Rapids & Ind.	\$365,975	\$337,399	I.	\$28,576	8.5
Net earnings	92,204	92,526	D.	262	0.3
P. c. of expenses	74.78	72.66	I.	2.12	2.9
International & Gt. Northern	427,232	503,822	D.	76,590	15.2
Net earnings	130,390	78,500	I.	52,349	67.0
P. c. of expenses	69.19	84.48	D.	15.29	18.1
Month of April:					
Erie	\$1,127,079	\$1,280,881	D.	\$153,802	12.0
Net earnings	235,374	401,863	D.	166,541	41.4
P. c. of expenses	79.13	68.62	I.	10.49	15.3
Month of June:					
Denver & Rio Gr.	\$89,435	\$57,502	I.	\$31,933	55.5
Ind. Bloom. & West.	84,068	85,090	D.	1,022	1.2
St. L. & S. E., St. Lo's					
Div.	47,038	43,135	I.	3,903	9.1
Kentucky Div.	26,767	24,528	I.	2,239	9.1
Tennessee Div.	13,104	11,155	I.	1,949	17.4
Scioto Valley	27,576				
First Week in July:					
Denver & Rio Gr.	\$23,308	\$15,068	I.	\$8,240	54.6
St. Louis, Iron Mt. & Southern	68,000	71,745	D.	4,745	6.6
Week ending July 5:					
Gt. West., of Can.	\$81,819	\$81,225	I.	\$594	0.7
Week ending July 6:					
Grand Trunk	\$143,574	\$162,511	D.	\$18,937	11.7
Coal Movement.					
Anthracite tonnages for the week ending July 6 were: 1878, 153,648; 1877, 843,482; decrease, 189,834 tons, or 55.3 per cent. Cumberland shipments by all lines were 32,328 tons.					
Work in the Schuylkill anthracite region was generally resumed July 15, after a suspension of two weeks.					
Grain Movement.					
Receipts of grain of all kinds at the eight leading Northwestern markets for the week ending July 6 have been, in bushels, for five years:					
1878.	1877.	1876.	1875.	1874.	
3,006,596	1,939,151	2,737,617	2,257,306	3,825,508	
The increase this year is 56 per cent. over those of 1877, yet the receipts are nearly one-fourth less than the previous week, and have been smaller but twice since the middle of March.					
The shipments of these same markets for the same week were:					
1878.	1877.	1876.	1875.	1874.	
3,059,500	2,416,415	2,970,194	2,939,833	3,380,618	
These shipments are larger than for the two weeks previous, and are really large for the season.					
The number of bushels of the above shipments and the percentages of the totals which were shipped by rail were:					
1878.	1877.	1876.	1875.	1874.	
826,301	557,394	1,205,184	786,919	1,420,103	
27.0	23.1	40.6	26.7	42.0	

The receipts of the seven Atlantic ports for the same week have been:

1878.	1877.	1876.	1875.	1874.
3,662,715	2,060,484	3,824,336	2,805,086	4,351,626

The percentage of the total received at New York was 61.6 per cent.; at Philadelphia, 13; at Montreal, 8.9; at Baltimore, 8.6; at Boston, 5.7; at New Orleans, 2, and at Portland, 0.2 per cent. The proportion at New York is the largest for some time.

THE SCRAP HEAP.

Steam Road Wagons in Wisconsin.

The competitive trial for the prize of \$10,000 offered by the state of Wisconsin for the best steam road wagon was to have taken place July 15, having been postponed from June 10. The wagons were to run on the highway road from Green Bay to Madison, by way of Oshkosh, Fond du Lac, Janesville and Beloit, a circuitous route, requiring about 200 miles of travel. This ought to be a pretty severe practical test of their working.

Railroad Wages in Saxony.

The United States consul at Chemnitz reports as follows to the State Department: In the railway service the superintendent's salary is the highest, \$1,581.68; few employees receive over \$1,000 per annum. Section hands are paid \$144.80 to \$174.45 per year. A certain sum is allowed to all employees for clothing, and some are furnished with houses and servants. Ticket agents receive 1 per cent. commission on the tickets they sell. The engineers and firemen are allowed for any savings they make in the coal and oil furnished to the trains by the government. The salary of an engineer is \$535.50; firemen, \$300; conductor, \$444; ticket agents, \$723 and \$609; freight masters, \$571.

What Was the End of It?

There were four of us in one of the cars on the Lyons Railroad. Four smokers—a fact which had naturally a tendency to bring us into sympathetic relations. I forget exactly how we fell into conversation, but at any rate by the time we had got to Villeneuve the conversation was general on the subject of railroad accidents. We had all told stories of more or less interest, garnished with the greatest amount of danger possible, when the only one among us who had not yet furnished a budget of adventure said:

"All that, gentlemen, is undoubtedly extremely interesting, but will you allow me to say that the whole of the singular accidents of which you have spoken are as nothing compared to a railroad catastrophe which happened some years ago in England, and at which I was unwillingly present."

Very naturally this beginning awakened our interest, and we entreated him to go on. "Willingly, gentlemen," said our traveling companion. "As I said before, it was in England, about five years ago. I had taken the Bristol train at 6 o'clock in the morning—a morning that I shall never forget—for a little village some twenty miles off. We had been going along very smoothly, when, from the railroad carriage in which I was placed—the first on the train—the noise of a violent quarrel reached me. I looked out of the window. The noise came from the locomotive, where a fight had begun between the engineer and the fireman. I learned later the cause of the dispute, which I might as well say now, arose from jealousy of some woman. It had long burned in their hearts, and now that the explosion had come it was violent."

"I was, as I said, gentlemen, at the window looking out, when the noise redoubled. The struggle was becoming furious. The two men were fighting like wild beasts. You shudder, gentlemen. Ah! I shudder still when I see—what I shall never cease to see. The two men writhed out of the engine in their agony, and rolled off. The train was going at the rate of twenty miles an hour. Left to itself the engine went faster and faster. The fields, the trees, the houses disappeared in a way that made my head swim. We passed a station. We scarcely had time to see it. Another was passed; a third, a fourth. Cries of horror were heard from the different coaches. We felt that we were lost. Already I could see the little depot at the end of the route; nothing could save us from being dashed to pieces. I resigned myself to fate and shut my eyes."

"Fontainebleau! Fontainebleau!" broke in the voice of the conductor, interrupting the story of our companion. "Sorry, gentlemen, but I get out here."

And bowing politely he disappeared. None of us have ever heard the end of that story.—*Courier des Etats Unis.*

Tramps.

A large number of tramps, driven out of Iowa by prompt action on the part of the authorities there, are reported as congregating at Beloit and other places in Wisconsin and taking possession of trains. The Governor of that State has notified local authorities to take action at once and to call out all the force within reach to put down the nuisance.

If telegraphic reports are to be believed, the life of a trainman on a freight train in some of the Western States is just now as exciting and almost as dangerous as that of a cavalryman during the war.

A Long Lost Car.

The Newcomerstown (O.) correspondent of the Cleveland Herald says: "A singular discovery was made the other day by some little boys while bathing in the Tuscarawas River, just west of the town. While one of the little fellows was diving he struck what he supposed was some old planks on the bottom, but which on examination proved to be a freight car. About 14 years ago there was a wreck on the Pittsburgh, Cincinnati & St. Louis Railroad near the river bridge, in which 15 or 20 loaded freight cars went down into the river, and it is supposed that the car recently discovered is one of them. Should the freight in the car prove to be imperishable, it will be some curiosity to see what it is. The company will probably raise the car ere long."

Government Contracts.

Proposals will be received by Major D. C. Houston, United States Engineers, at his office in Milwaukee, Wis., until July 30, for the improvement of the harbors at Racine, Wis., and Kenosha, Wis.

Proposals will be received by Major F. Harwood, United States Engineers, at his office in Detroit, Mich., until July 10, for dredging Cheboygan Harbor; also for dredging and for building pile piers in Saginaw River.

Notes.

Beer and coffins formed the rather mixed load of a freight car recently burned up on the Erie. A strict temperance man might think there was a logical connection between the two.

An envious Pittsburgher, who cannot enjoy the advantages of rapid transit, says: "New Yorkers claim that their nervous systems are being ruined by the noise of the elevated railway, and when the resident of that city comes home in a dilapidated condition, and hangs his hat up on

the floor, he explains it to his wife by saying, 'Nerves all gone. Been see a frien' on Sixth avenue.'"

A dispatch recently received at Milwaukee said that 250 tramps were on an incoming freight. All the available police force was mustered and reinforced by 50 hastily-armed yardmen; the force was drawn up at the head of the yard, and, after waiting an hour in the sun, the train came in; a box car was opened, and five dilapidated specimens crawled out. The operator had made a mistake in the number.

A Noblesville (Ind.) colt was frightened and jumped between two cars of a passing freight train. The train stopped a mile further on, when the colt jumped down unhurt, having been safely carried between the cars.

The brakeman who told this story has since mysteriously disappeared. An awful warning.

Color Blindness and its Dangers.

The Royal Academy of Belgium, says *Galvani's Messenger*, has just published the report of a committee appointed to consider the subject of color blindness, in which the safety of the traveling public is so largely interested. The first question it had to consider was whether Daltonism is inherent to the constitution of the person affected by it, or whether it can be contracted accidentally. To that inquiry the committee replies that the defective vision may arise from a serious illness; bruises or wounds on the head, the abuse of tobacco or the immediate use of alcoholic drinks, and it, therefore, recommends the periodical examination of all persons who have to deal with colored signals. The second question was: Can any practical and efficacious means be discovered to show that an agent is menaced with the loss of perception of color? To that the answer was that, as color blindness is often only partial, accidental, or momentary, no such means exist. But the committee proposes a method to prevent accidents occurring through the defect in question. It consists in adapting to every locomotive a rapidly-analyzing apparatus which suppresses, even for those whose vision is defective to the highest degree, the possibility of confounding red or green with any other color. The apparatus consists of two glasses—one green and the other red. The moment the driver has the slightest doubt as to the color of a signal all he has to do is to look through these glasses. Seen through the red glass the signal of that color will acquire more brilliancy and will form a stronger contrast with all the rest of the visual field, because it hinders the passage of the other colored rays of light. On the other hand, if a green signal is observed through a red glass the light is extinguished—apparently—as the blue and yellow rays which compose it cannot traverse the red of the glass. The same effect is produced in the opposite direction by the green glass, which prevents the passage of the red rays, and consequently a light of that color becomes almost, if not quite, invisible. That means of determining signals, although infallible in daylight, is not so efficacious at night, but would be nevertheless a great protection to the traveling public.

OLD AND NEW ROADS.

Atchison, Topeka & Santa Fe.—On July 16 the issue of \$750,000 new bonds of the leased Pueblo & Arkansas Valley road had all been subscribed for. Of the issue of \$2,621,000 New Mexico & Southern Pacific bonds, \$2,048,000 had been taken, and it was expected that the remainder would be subscribed for this week. These bonds are issued to provide means for the new extensions now in progress.

Notice is given that proposals for the grading, masonry and tracklaying of 113 miles of the New Mexico & Southern Pacific road, from Willow Springs to Las Vegas, N. M., will be received at the office of A. A. Robinson, Chief Engineer, at Pueblo, Col., until Aug. 15. Profiles and estimates can be seen there or at Trinidad, Col., after Aug. 1. Specifications, conditions and forms of bid may be obtained on application to the office in Pueblo.

Contracts for 57 miles of the Leadville Extension, from Canon City, Col., to South Arkansas, have been let, eight miles to John Scott, of St. Louis, and 49 miles to McCarthy & Holman, of Little Rock, Ark. Mr. Scott's section includes the heavy work through the Grand Cañon. The work is to be done by Jan. 1, 1879.

The Land Department reports for the six months ending June 30 sales amounting to \$599,374, against \$134,265 for the same time in 1877. The cash receipts on land sales for the six months were \$334,041, against \$143,702 in 1877.

Bellaire & Southwestern.—This company has contracted for the rails to lay 25 miles of the extension of the road from Wegee, O., southwest.

Boston, Hoosac Tunnel & Western.—The contract for grading this road through Vermont has been let to Sherwood & Elliott. The distance is 19 miles and the new track will be parallel and close to that of the Troy & Greenfield, now leased to the Troy & Boston Company.

The bridge over the Hudson River is completed, and the rails are now being laid on the section of 16 miles from Mechanicsville, N. Y., east to Eagle Bridge.

The company has completed an organization in Vermont, covering the section of road to be built in that State.

Burlington & Northwestern.—This company has offered to extend its road from Winfield, Ia., northwest about 18 miles to Washington, provided that town will vote a 3 per cent. tax.

Canadian Pacific.—Notice is given that the Government of Canada will receive proposals for constructing and working a line of railway extending from the Province of Ontario to the waters of the Pacific Ocean, the distance being about 2,000 miles. Memorandum of information for parties proposing to tender will be forwarded on application as underneath. Engineers' reports, maps of the country to be traversed, profiles of the surveyed line, specifications of preliminary works, copies of the Act of the Parliament of Canada under which it is proposed the railway is to be constructed, descriptions of the natural features of the country and its agricultural and mineral resources, and other information, may be seen on application at the Department of Public Works, Ottawa, Canada, or to the Engineer-in-Chief at the Canadian Government Offices, 31 Queen Victoria street, E. C. London. Sealed tenders, marked, "Tenders for Pacific Railway," will be received, addressed to F. Braun, Secretary, Public Works Department, Ottawa, until the 1st day of December next.

Charlotte, Columbia & Augusta.—It is currently reported that negotiations are in progress for the transfer of a controlling interest in this road to the Richmond & Danville Company, to be followed by a lease of the road to that company.

The road is 195 miles long, from Charlotte, N. C., to Augusta, Ga., and is one of the Southern Security Company's roads. The lease, if carried out, would probably be followed by as great a diversion of business as possible from the Atlanta & Charlotte Air Line.

Another report is that a number of the individual stockholders have combined and are trying to buy the Southern Security Company's stock in the road.

Chicago & Alton.—Rapid progress is reported on the new extension of this road to Kansas City. The grading is nearly completed from Mexico, Mo., westward 84 miles to Marshall, and the rails are laid for 27 miles southwestward from Mexico. Work is progressing well on the bridge over the Missouri at Glasgow. West of Marshall the contractors are busy on the grading, and the company hopes to run trains to Kansas City in October.

Chicago, Milwaukee & St. Paul.—On the extension of the Iowa & Dakota Division westward, track is now laid to Emmitsburg in Palo Alto County, Ia., 25 miles west from the old terminus at Algona. Work is actively in progress on the grading west of that point.

Chicago & State Line.—This company has been organized by the purchasers of the Chicago & Southern road at foreclosure sale, and has filed articles of incorporation in Illinois. The capital stock is to be \$5,000,000.

Cincinnati, Hamilton & Dayton.—In the suit brought to restrain this company from paying interest on the Cincinnati, Hamilton & Indianapolis bonds, an answer has been put in, alleging that the company is the real owner of the Indianapolis road, and that the outstanding bonds are valid obligations. The answer further claims that the suit is brought by collusion with the company and with the intent of defrauding the owners of the bonds, and asks that judgment be given for the amount of the interest over-due.

Cincinnati Southern.—At a meeting held July 10 the stockholders of the "Common Carrier" company, which now works the completed section of the road, voted to increase the capital stock to \$2,500,000, and to authorize the directors to bid for the contract for completing the road to Chattanooga and working the same.

The Citizens' Association of Cincinnati has presented a memorial to the City Solicitor, asking him to bring a suit in any court of competent jurisdiction to test the constitutionality of the acts authorizing the construction of this road, and also to test the powers of the trustees and the validity of their past acts, and to require from them a full account of their trust.

Danville, Hazleton & Wilkesbarre.—Alexander F. Porter has begun suit in Philadelphia to compel the bondholders' committee to allow him to come in on equal terms with those bondholders who joined in the purchase of the road at foreclosure sale.

Simon P. Kase has also filed a bill in equity, asking the Court to compel the Pennsylvania Railroad Company to pay several years' interest on the bonds, which, he claims, is due as rental of the road. The bill alleges that the board of directors of the company is under the control, and in the interest of the Pennsylvania, and therefore no suit has been brought in the name of the company.

Delphos, Bluffton & Frankfort.—The contract for building 15 miles of this road, from Bluffton, Ind., to Warren, has been let to James Crosbie & Co., of Bluffton. They have already sub-let most of the grading.

Detroit & Milwaukee.—Receiver Trowbridge's report for June is as follows:

Balance, May 31	\$57,108.16
Receipts	72,915.06
Total	\$130,023.82
Disbursements	89,170.28
Balance, June 30	\$40,853.54

The disbursements exceeded the receipts by \$16,254.62 for the month. At the close of the month there were \$295,598.70 receiver's certificates and \$50,000 notes outstanding.

Eastern.—A dispatch from Portsmouth, N. H., July 15, says: "Attachment has been made of all the interest of the Eastern Railroad in the capital stock of the Portsmouth, Great Falls & Conway Railroad, at the suit of the National Bank of Commerce to recover \$100,000 in damages. The suit is founded on a note of the Eastern Railroad, made in November, 1873, payable in three months."

Empire Transportation Co.—At the meeting held in Philadelphia, July 11, the stockholders of this company voted to close up its affairs, dissolve the company and to sell the remaining assets, which cannot well be divided, to the Erie & Western Transportation Company, taking in payment 6 per cent. bonds of that company, the amount to be determined by appraisal, and the bonds to be distributed among the Empire stockholders in final settlement.

Grand Trunk.—The Detroit papers are busy laying out lines by which this company can reach Chicago. The favorite one is made up by building 26 miles of new road from Detroit Junction to Ypsilanti; then running 65 miles to Banker's over the Detroit, Hillsdale & Southwestern; thence 46 miles to Auburn on the Fort Wayne, Jackson & Saginaw, and thence to Chicago on the Baltimore & Ohio track. This would make a line from Detroit to Chicago the same length as the Michigan Central. Other routes are proposed, but all of them are entirely conjectural, the company having done nothing at all in this direction.

Grayville & Mattoon.—The track on this road is now completed to Mattoon, Ill., and the road was formally opened to that place July 8. The extension is from a point two miles north of Prairie City, Ill., to Mattoon, 18 miles, and has been built by the Receiver, under order of Court. The whole road is now 75 miles long, from Mattoon a little east of south to Parkersburg; it will be worked in connection with the Decatur, Mattoon & Southern, which runs northwest 40 miles to Decatur.

Chief Engineer R. J. Lawrence writes us as follows of this extension: "There has been 18 miles of track laid and 12 miles of grading done since April 1, 1878, under the direction and management of J. D. Herkimer, Receiver. It is his intention to complete the southern end, a distance of 25 miles, by winter."

Illinois Central.—Considerable damage is reported from freshets on the North Division of this road, four bridges and some 500 feet of track having been washed away in several places, making a break of seven miles near Galena, Ill. When the damage had been nearly repaired, a second freshet washed away two of the newly-erected bridges.

Indianapolis, Decatur & Springfield.—The track is now laid to the Logansport, Crawfordsville & Southwestern crossing at Bruin, Ind., which is 19 miles east by north from the former terminus at Montezuma, and 104 miles from the western terminus at Decatur, Ill.

Indiana North & South.—Suit has been begun by the Union Trust Company, Trustee, to foreclose the mortgage upon this road. The appointment of a receiver, pending the suit, is asked for. The road is 18 miles long, from Attica, Ind., to Feedersburg; by the latest report the funded debt was \$135,000.

Jacksonville, Pensacola & Mobile.—The United States Circuit Court has referred to a master the question of the amounts due and unpaid for the extension of the road

from Quincy, Fla., to the Chattahoochee River, built several years ago.

Junction & Breakwater.—The track is now laid on the branch of this road from Lewes, Del., east by south to Rehoboth Beach, six miles. At Rehoboth there is a large camp-meeting ground and summer resort, which is expected to bring a considerable traffic over the road during the season.

Keokuk & Northwestern.—This company has been offered the graded road-bed and other property of the old Keokuk, Iowa City & Minnesota Company, on condition that it will provide for certain indebtedness of the old company out of the first subscriptions obtained. It was decided to accept, provided the people of Keokuk will vote a tax in aid of the road.

Lafayette, Muncie & Bloomington.—A petition has been filed by A. B. Baylis, Trustee, in the United States Circuit Court in Indianapolis, asking for a judgment of foreclosure and an order of sale of the property under the first mortgage for \$1,500,000.

Lake Erie & Louisville.—The track on the Celina Division is now laid and ballasted to Celina, O., five miles beyond the point last noted, and 11 miles westward from the former terminus at St. Mary's. The company expects to build the road through to the Indiana State line this Summer.

Lake Jessup, Osceola & Kissimee.—This company has been organized to build a railroad from Lake Jessup, Fla., the head of navigation on the St. John's River, to Orlando, 13 miles, the line to be extended hereafter to Lake Tohopekaliga, the head of a branch of the Okeechobee. The road is to be a light road with the lightest possible equipment, and as near a surface line as possible. The headquarters of the company are at Orlando, Orange County, Florida.

Maine Central.—The change in the staff of this road within a few years is a good illustration of great reduction in the number of railroad officers that has been made on many lines in the efforts at economy. Since 1871 the Maine Central has comprised under one organization and management the original Maine Central Railroad, and the Portland & Kennebec and the Androscoggin railroads—the two latter leased for 999 years—bringing up the total length worked to 355 miles of road. When the road was consolidated under the presidency of Hon. R. D. Rice, there were two superintendents, one chief engineer, and one master mechanic, with three assistants—one each at Waterville, Augusta and Farmington, where there are repair shops. Since that time there have been three changes in the presidency; part of the time there has been a general manager in addition to the two superintendents, but now the company has settled down to an organization. There is under the President (Mr. E. B. Jackson, of Portland) a superintendent (Mr. Payson Tucker, at Portland), and one master mechanic (Mr. J. W. Philbrick, at Waterville)—no chief engineer and no assistant master mechanics. In 1875 the general offices were removed from Augusta to Portland; in July, 1876, the repair shops at Farmington were discontinued and the machinery and tools removed to Waterville, and now (dating from June 1) the locomotive repair shop at Waterville is discontinued. At the same time the company made a large reduction in the number of men employed and in the wages of those who were kept. Then in the machinery department the work which was formerly done by a chief with three assistants in three shops is now committed to a single officer at one place.

McKean & Buffalo.—Recently a suit was begun against this company by the Equitable Petroleum Company to recover damages for a refusal by the railroad company to carry oil offered as freight by the plaintiff. An offer to settle was made, and it was discussed at a meeting held last week, when the railroad company agreed to carry the oil offered, and guarantee its delivery at Buffalo, the suit to be withdrawn. This was satisfactory and the first shipments have been made, reaching Buffalo over the Buffalo, New York & Philadelphia road. This is regarded locally as a victory over the Standard Oil Company.

Memphis & Vicksburg.—The city of Vicksburg, Miss., has decided to subscribe \$100,000 in aid of this projected road. Sharkey County has also voted a subscription of \$75,000.

Minneapolis Eastern.—An agreement has been entered into by which so much of this projected road is to be built as will be needed to connect the flour mills and elevators in Minneapolis, Minn., with all the roads entering the city. The Minneapolis & St. Louis Company alone declines to enter into the arrangement, and will take no part in building the road.

Missouri Pacific.—The Central Trust Company, of New York, has been made trustee of the third mortgage, in place of the National Trust Company. The change has been approved by the Court.

Monroe, Bastrop & Arkansas.—Efforts are being made to raise the money needed to build this road from Monroe, La., the terminus of the Vicksburg, Shreveport & Texas road, northeast to Bastrop, a distance of 23 miles. The cost is estimated at \$140,000.

Montclair & Greenwood Lake.—An adjourned meeting of bondholders was held in New York, July 17, and a new committee was appointed to prepare a plan for the reorganization of the road, which shall unite the now conflicting interests. The committee consists of Cyrus W. Field, Abram S. Hewitt and Morris K. Jesup, for the first-mortgage bondholders; B. C. Baker, W. L. Raymond, W. C. Sheldon, Egbert Starr and Daniel Chauncey for the second-mortgage bondholders. The meeting was rather a turbulent one. A separate meeting of second-mortgage bondholders was afterwards held, at which there was some sharp discussion, but no action taken.

Montreal, Portland & Boston.—It is stated that the differences in the management of this company have been finally arranged, the Goff party retiring from the contest and leaving full control and possession of the road to the Willett party, which represents the interest of the Connecticut & Passumpsic Rivers Railroad Company.

New York, Boston & Montreal.—In accordance with an order of the New York Supreme Court, the Farmers' Loan & Trust Company has conveyed all its interest and title as trustee in the property bought in by it at foreclosure sale in 1876 to Herman R. Baltzer and Wm. G. Taaks, Receivers appointed some time ago in the suit brought by the Banque Franco-Egyptienne. The sale in 1876 was of the property covered by the first mortgage executed by the old New York & Boston Company.

Ogdensburg & Lake Champlain.—At a meeting held July 16 the board appointed a committee to investigate charges presented by some of the stockholders. President Pratt requested that the examination be made thorough and offered to retire from the active management until it should be completed, in order that the committee might be perfectly free to act.

Pacific Mail.—This company has given the required notice of its intention to cancel the contract now in force with the Union and Central Pacific companies as to through freight business between New York and San Francisco.

Pemberton & New York.—This road extends from Whiting Junction, N. J., to Pemberton, 18 miles, and is worked as a branch of the New Jersey Southern. The bonds were indorsed by the United New Jersey Company, and the interest has been paid by that company and, since the lease of its property, by the Pennsylvania, which assumed the obligations of the United Company. The Pennsylvania Railroad Company has now begun a suit to foreclose the mortgage, and the New Jersey Court of Chancery has appointed Col. I. S. Buckelow Receiver, pending the trial of the suit.

Philadelphia & Atlantic City.—Application was made to the Chancellor of New Jersey in chambers at Newark, July 13, by counsel for Wm. Massey, of Philadelphia, for the appointment of a receiver for this road. The complaint sets forth that Mr. Massey owns \$221,000 bonds of the company, and that default was made in the July coupons; that he has indorsed \$260,000 notes of the company and is further its creditor to the amount of \$14,200, and that there is a floating debt due other parties of about \$75,000. It is charged that the corporation is wholly insolvent. The Chancellor granted the order asked for and appointed Charles R. Colwell (President of the company) Receiver.

The road is of 3 ft. 6 in. gauge and is 55 miles long, from Camden, N. J., to Atlantic City. It was built last year and is parallel and close to the Camden & Atlantic road. The application was not unexpected, as Mr. Massey, who furnished most of the money to build the road, has lately made no secret of his dissatisfaction, but has publicly proclaimed it, as shown by the following from the Philadelphia Dispatch:

"The other day the new road celebrated its formal opening for the season with an excursion, to which were invited Mayor Stokely and a goodly number of prominent citizens. At the Lafayette Excursion House a banquet was served; and among the speeches made on that occasion was one by Mr. Massey, who has always been recognized as the Ceresus of the corporation, by whose dollars the thing was kept a-going. You may imagine the astonishment of the party when he arose and rebuked the citizens of Atlantic City for their desertion of this road, their apathy and their greed for free passes—intimating that, unless they made the best of their opportunity, they would have but one road to deal with next year. He spoke of his associates as men in whom he had been deceived. He had been led into the undertaking under the impression that they knew more about railroads than they do."

Philadelphia & Reading.—A proposition from parties interested who offer certain aid for the extension of this company's leased Catawissa road into the coal fields of Clearfield and Centre counties and to Lock Haven, is now under consideration.

The Pottsville (Pa.) *Miners' Journal* says: "The report of the operations of the Beneficial Fund of the Philadelphia & Reading Coal & Iron Company for the seven months ending Nov. 30, 1877, has been published. There are 2,284 members contributing to the fund, and of these more than 5 per cent. were injured by individual accidents during the seven months which the report covers. Many of those injured received almost as much in dollars for their relief as they had paid in cents to the fund. To the family of one who joined in May, paying 60 cents, \$192.16 was paid in June, when he was killed. The total receipts from members amounted to \$2,050.95, and the disbursements to the injured to \$1,802.21. The average payment of the members was less than \$1 each; the average receipts of those injured exceeded \$15 each."

All the employees of the company in the coal regions having been treated to a day's holiday and free trip to the Permanent Exhibition in Philadelphia, those in and about Philadelphia signified their preference for a trip to the coal regions, and this was given them on Sunday, July 14, several special excursion trains being run to accommodate them.

Pittsburgh, Titusville & Buffalo.—In the matter of the fund remaining over in the hands of the Court from the sale of the old Oil Creek & Allegheny River road, the Court has finally decided to sustain the report of the Master, awarding \$51,546 to the Pennsylvania Transportation Company, and \$7,367 to the Atlantic & Great Western. This has been resisted by the new company and the bondholders, who claimed that these debts were shut out by the foreclosure, but the Court held them valid claims and a lien upon the funds.

Providence, Brookfield & Hoosac Tunnel.—This company has completed a preliminary organization and purposes building a railroad from Southbridge, Mass., the terminus of the Southbridge Branch of the New York & New England road, northward through Sturbridge and Brookfield to Hardwick, there to connect with the Massachusetts Central when that road is completed. The distance is about 23 miles, and the object is to give the New York & New England a connection with the tunnel.

Richmond, Fredericksburg & Potomac.—In answer to a memorial presented by a number of stockholders, protesting against the proposed contract with the Potomac Steamboat Company, the Virginia Board of Public Works has instructed the Attorney General to take action at once and to institute such proceedings as may be necessary to protect the state's interest in the road.

Rochester Southern.—This company has filed article of incorporation in Minnesota to build a railroad from Rochester south to a point on the Southern Minnesota road, and thence to the Iowa line, about 40 miles. The capital stock is to be \$500,000.

Saginaw Valley & St. Louis.—At the annual meeting in Saginaw City, Mich., July 10, the stockholders voted to increase the capital stock from \$300,000 to \$1,000,000. They also resolved to authorize the extension of the road from St. Louis, Mich., west by south to Grand Rapids, about 60 miles, and the construction of a branch from St. Louis northwest to Mt. Pleasant, about 17 miles.

St. Louis, Iron Mountain & Southern.—The City Council of St. Louis has finally passed the ordinance authorizing this company to lay a track from Carondelet along the levee on the river front to the northern part of the city. The company has desired for several years to make this extension for convenience in handling its freight business, but has met with much opposition, and has never until now been able to secure permission. The new freight track will be about six miles long.

St. Paul & Pacific.—The Amsterdam bondholders' committee announced recently that dividends would be paid June 26 on the certificates issued to those holders who agreed to the arrangement for the sale of their bonds, as follows: On each \$1,000 Branch Line bond, \$26.25; on each consolidated bond, \$9.80; Main Line bond, \$10.50; loan of 1869, \$12.25; St. Vincent Extension and Brainerd Branch \$4.81,

and on each share (\$100) of Red River & Manitoba stock, \$3.30. From July 1 the certificates are sold ex-dividend.

Sonoma Valley.—This company has filed articles of incorporation in California for a narrow-gauge road from the mouth of Tolay Creek on San Pablo Bay through Norfolk to Sonoma, a distance of 14 miles. The capital stock is to be \$200,000.

Texas & Pacific.—Surveys are being made for an extension of the Transcontinental Division from Sherman, Tex., westward 18 miles to Whitesboro. Five miles of this extension will be part of the line from Sherman to Fort Worth.

Texas papers state that the company has agreed to extend the main line from Fort Worth west to Weatherford, 31 miles, provided the parties interested will raise money enough to pay for the grading, bridging and ties.

Wabash.—This company has entered into competition for Detroit business, and recently opened a ticket and freight office in that city, which is in charge of Mr. C. Sheehy, Northern Agent of the road.

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New Orleans, Mobile & Texas.

The trustees operating this road, from New Orleans, La., to Mobile, Ala., 141 miles, have made the following statement for the year ending Jan. 31, 1878:

The earnings of the road for the year were as follows:			
	1877-78.	1876-77.	Inc. or Dec. P. c.
Passengers.....	\$301,989
Freight.....	383,532
Other sources.....	44,509
Total.....	\$730,010	\$672,441	I. \$57,569 8.6
Expenses.....	339,354	308,163	I. 31,191 10.1
Net earnings.....	\$390,656	\$364,278	I. \$26,378 7.2
Gross earnings per mile.....	5,177	4,769	I. 408 8.6
Net.....	2,771	2,584	I. 187 7.2
Per cent. of expenses.....	46.49	45.86	I. 0.63 1.4

In the number of through passengers there was an increase of about 10 per cent., and in the number of local passengers a small increase. In the early part of the year the rates for transportation of local passengers were advanced, to which a part of the increase in revenue is due. The gross tonnage transported during the year increased 20,937 tons, or about 13 1/2 per cent., as compared with the transportation during the previous year. The transportation of sugar and molasses decreased by reason of the partial failure of the sugar crop in Louisiana; that of general merchandise increased; and that of cotton increased 16,336 bales. Full detailed information regarding the transportation of passengers and freight is given in the statements appended to the report. The number of train miles run during the twelve months was 544,455, an increase of 27,617, or about 5 per cent., as compared with the number run during the previous year.

A condensed statement for three years is as follows:

Net earnings from operation.....	\$1,177,697
Extraordinary expenses, renewals and improvements, three years.....	791,171
Surplus.....	\$386,526
Certificates of indebtedness issued.....	447,938
Total.....	\$834,464
Special expenses, 1875-76.....	\$88,200
" " 1876-77.....	467,709
" " 1877-78.....	286,478
Total.....	\$842,387
Materials and fuel on hand.....	32,466
	\$74,853

Excess of payments..... \$40,389
Add payments on account of old debt of company..... 16,315

Liabilities in excess of certificates..... \$56,704

All the certificates of indebtedness issued in accordance with the orders of the Court, prior to Dec. 1, 1877, matured upon that date, and were paid by money received from the issue of new certificates, in amount just sufficient to provide for such payment, bearing interest at the rate of 8 per cent. per annum, and payable on (or before, at the option of the trustees) the first day of December, 1879. The amount of such new certificates issued and now outstanding is \$447,938. The Court by special order authorized the issue of such certificates for the purpose and to the amount above stated; and in the same order authorized the issue of like certificates, in the same manner, to provide any amount, not exceeding \$80,000, which should be required to pay all the liabilities of the Trustees existing at the close of the year ending Jan. 31, 1878, in excess of the amount of their receipts from the earnings of the road, and from certificates of indebtedness issued prior to that time. The amount of such excess of liabilities, as stated in the synopsis of earnings, expenses, etc., made by the Treasurer and appended to the report, is \$56,704. To provide this sum, certificates of indebtedness will be issued, in accordance with the order of the Court. The Trustees do not expect to apply to the Court for the issue of certificates of indebtedness in addition to the amounts above stated. It is estimated that the earnings of the road during the present year will will exceed the expenditures for the time, of every kind, including bridge-work and interest upon certificates of indebtedness issued.

Atlantic, Tennessee & Ohio.

This company owns a road from Charlotte, N. C., north to Statesville, 47 miles. At the annual meeting in Charlotte recently the President reported that the debt was now as follows:

Gold bonds.....	\$65,000.00
Judgment debt.....	92,482.10
Floating debt, loans, etc.....	28,625.00
Total (\$3,900 per mile).....	\$186,107.10

The company holds \$9,200 Mecklenburg County and \$40,000 Charlotte City bonds. The report says: "The gold bonds, except the 65 sold, are now under the control of your President; the \$100,000 recently under the control of Mason Young, having been turned over to your President, have been placed by him for safe keeping in the Park Bank of New York, the remaining \$85,000 being now in the First National Bank of Charlotte."

The earnings for the year ending May 30 were as follows:

	1877-78.	1876-77.	Inc. or Dec. P. c.
Earnings.....	\$44,464.70	\$37,493.80	I. \$6,970.90 18.6
Expenses.....	28,917.70	30,465.25	D. 3,547.55 11.6
Net earnings.....	\$17,547.00	\$7,028.55	I. \$10,518.45 150.3
Gross earn. per mile.....	946.06	797.74	I. 148.32 18.6
Net.....	373.34	149.54	I. 223.80 150.3
Per cent. of expenses.....	60.49	81.34	D. 20.75 25.6

Included in expenses were \$2,610 paid for permanent improvements of the property. All interest accruing was promptly paid from earnings of the road. An increase in business is looked for from the extension of the Western North Carolina road.